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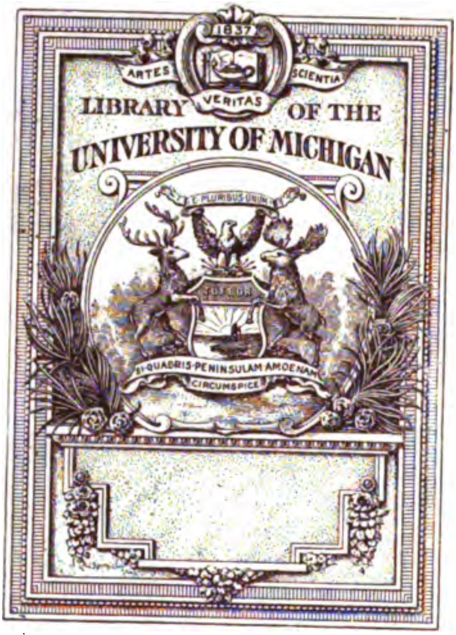
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LEGISLATIVE DOCUMENTS

SUBMITTED TO THE

Twenty-seventh
General Assembly

OF THE

STATE OF IOWA,

Which Convened at Des Moines, January 10, 1898.

LESLIE M. SHAW,	Governor
J. C. MILLIMAN,	Lieutenant-Governor and President of the Senate
G. L. DOBSON,	Secretary of State
C. G. McCARTHY,	Auditor of State
JOHN HERRIOTT,	Treasurer of State
R. C. BARRETT,	Superintendent of Public Instruction
MILTON REMLEY,	Attorney-General
J. H. FUNK,	Speaker of the House of Representatives

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DES MOINES:
F. R. CONAWAY, STATE PRINTER.
1898.

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Governor's Inaugural Address.
Auditor of State—Biennial Report.
Treasurer of State—Biennial Report.
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NINTH

BIENNIAL REPORT

OF THE

BOARD OF HEALTH

OF THE

STATE OF IOWA

FOR THE

FISCAL PERIOD ENDING JUNE 30, 1897.

SALUS POPULI SUPREMA EST LEX

DES MOINES:
F. R. CONAWAY, STATE PRINTER,
1897.

STATE OF IOWA,
OFFICE OF SECRETARY, STATE BOARD OF HEALTH,
DES MOINES, July 1, 1897.

To Francis M Drake, Governor of Iowa:

SIR—In accordance with the provisions of section 11, chapter 151, laws of Eighteenth General Assembly, the Ninth Biennial Report of the State Board of Health, for the fiscal period ending June 30, 1897, is herewith presented.

J. F. KENNEDY, M. D.,
Secretary.

MEMBERS OF THE BOARD.

	TERM EXPIRES.
E. H. CARTER, M. D., Des Moines (Eclectic)	January 31, 1898
J. M. EMMERT, M. D., Atlantic (Regular)	January 31, 1899
R. E. CONNIFF, M. D., Sioux City (Regular)	January 31, 1900
J. A. SCROGGS, M. D., Keokuk (Regular)	January 31, 1901
JOHN C. SHRADER, M. D., Iowa City (Regular)	January 31, 1902
W. BANCROFT, M. D. (Homeopathic)	January 31, 1903
E. A. GUILBERT, M. D., Dubuque (Homeopathic)	January 31, 1904
WARREN DICKINSON, Civil Engineer, Des Moines	August 19, 1901
MILTON REMLEY, Attorney-General, *ex-officio.*	
JAMES I. GIBSON, D. V. S., Denison, State Veterinary Surgeon, *ex-officio.*	

PUBLIC HEALTH LAW.

CHAPTER 16.—TITLE 12.—CODE.

Membership of State Board.

Meetings.

Election of officers.

SECTION 2564. The State Board of Health shall consist of the Attorney-General, and the State Veterinary Surgeon, who shall be members by virtue of their offices, one civil engineer, and seven physicians, to be appointed by the Governor, each to serve for a term of seven years and until his successor is appointed, vacancies to be filled by the Governor for the unexpired term. But no one of the seven physicians hereafter appointed shall be an officer, or member of the faculty of any medical school, and the governor shall have the power to remove any member of said Board for good cause shown. It shall meet semi-annually in May and November, and at such other times as it may decide upon, such meetings to be held at the seat of government, suitable rooms therefor to be provided by the custodian of the capitol. At the meetings held in May, a president from their number and a secretary, who shall be a physician not of their number, shall be elected, and the latter have an office in the capitol.

Powers of State Board.

Rules to be enforced by local boards

Duties of State Board.

Biennial Report.

SEC. 2565. The Board shall have charge of and general supervision over the interests of the health and life of the citizens of the state, matters pertaining to quarantine, registration of marriages, births, and deaths, authority to make such rules and regulations and sanitary investigations as it from time to time may find necessary for the preservation and improvement of the public health, which when made shall be enforced by local boards of health and peace officers of the state. It shall prepare and furnish through its secretary to the clerks of the several counties, such forms for the record of marriages, births, and deaths as it may determine upon, and by its secretary make biennial reports to the Governor, which shall include so much of its proceedings, such information concerning vital statistics, such knowledge respecting diseases, and such instruction upon the subject of hygiene, as may be thought useful for dissemination among the people, with such suggestions as to further legislation as may be thought advisable.

Assessors to take births and deaths.

Must report to county clerk.

SEC. 2566. It shall be the duty of all assessors at the time of making assessments to obtain and report to the clerk of the district court upon blanks adopted by the State Board of Health, and furnished by said auditor, such registration of births and deaths as occur within their respective districts for the year ending December 31st, immediately preceding.

County clerk must keep record of registration.

County clerk, report to State Board.

SEC. 2567. The clerk of the court in each county shall keep a book in which shall be recorded all marriages occurring within the county, together with such data respecting the same as shall be required by the State Board of Health, and he shall report to the Secretary of the State Board of Health on or before the first day of June in each year such data respecting such marriages for the year ending December 31st. immediately preceding. The clerk of the district court of each county shall keep a book in which shall be recorded all births and deaths occurring within the county as shown by the returns filed in his office by the assessor, as provided in section three, and on or before the first day of June in each year shall furnish to the secretary of the State Board of Health a report of such births and deaths.

Local boards, Membership of.

Clerk of.

Health officer.

Powers and duties of.

Burial.

Nuisances.

Rabid animals.

Quarantine.

Nuisance—notice to be given.

Nuisance abated at owner's expense.

Quarantine by mayor or township clerk.

SEC. 2568. The mayor and council of each town or city, or the trustees of any township, shall constitute a local board of health within the limits of such towns, cities, or townships of which they are officers. The town, city, or township clerk shall be clerk of the local board, which board shall appoint a competent physician as its health officer who shall hold office during its pleasure. It shall regulate all fees and charges of persons employed by it in the execution of health laws, and its own regulations and those of the State Board of Health; have charge of all cemeteries dedicated to public use not controlled by other trustees or incorporated bodies, and the burial of the dead; make such regulations as are necessary for the protection of the public health, respecting nuisances, sources of filth, causes of sickness, rabid animals, and quarantine, not in conflict with any regulations of the State Board of Health, which shall also apply to boats or vessels in harbors or ports within their jurisdiction; to proclaim and establish quarantine against all infectious or contagious diseases dangerous to the public, and maintain and remove the same as may be required by regulations of the State Board; may when satisfied upon due examination, that any cellar, room, tenement building, or place occupied as a dwelling or otherwise, has become or is by reason of the number of occupants, uncleanliness, or other cause, unfit for such purpose, or a cause of nuisance or sickness to the occupants or the public, issue a notice in writing to such occupants or any of them, requiring the premises to be put in proper condition as to cleanliness or requiring the occupants to remove or quit such premises within a reasonable time to be fixed, and if the persons so notified or either of them neglect or refuse to comply therewith, may by order cause the premises to be properly cleaned at the expense of the owner or owners, or may forcibly remove the occupants and close the premises, and peace and police officers shall execute such orders, which premises so closed shall not be again occupied as a dwelling place without written permission of the board. The quarantine authorized by this section in case of infectious or contagious diseases may be declared or terminated by the mayor of any city or town, or the township clerk outside of such city or town, in cases required by regulations of the State Board of Health, upon written notice given by any practicing physician of the existence of such disease or the termination of the cause for quarantine as the case may be.

SEC. 2569. The local board may with its physician, when of the opinion it is necessary for the preservation of the lives or health of the inhabitants, enter a building, vessel, or place for the purpose of examining into, preventing, removing, or destroying any nuisance, source of filth, or cause of sickness, and in case its members or physician shall be refused such entry, make complaint through any member under oath to any magistrate of the county, whether a member of the board or not, stating the facts so far as known, and the magistrate shall thereupon issue his warrant directed to any peace officer of the county, commanding him between the hours of sunrise and sunset, accompanied by two or more members of the board, to prevent, remove, or destroy such nuisance, source of filth, or cause of sickness, which shall be executed by the officer under the direction of such members of the board, and it may order the owner of any property, building, or place, to remove at his own expense, within twenty-four hours or such other time as may be fixed by it, after notice has been served upon such owner, occupant, or other person in charge thereof, any nuisance, source of filth or cause of sickness found thereon, and if such person fails or neglects to comply with the order and make such removal, it may cause the same to be done at the expense of the owner or occupant.

May enter buildings.

Complaint to magistrate.

Execution of warrant.

Nuisance removed at owner's expense.

SEC. 2570. When any person shall be infected, or shall have been recently infected, or sick with small-pox or other disease dangerous to the public health, whether a resident or otherwise, it may make such provisions as are best calculated to preserve the inhabitants against danger therefrom by removing such person to a separate house, when it may be done without injury to his health, and provide nurses, needful assistance, and supplies, which shall be charged to the person, or those liable for his support, if able; if unable, it shall be done at the expense of the county. If such person cannot be removed, he shall be cared for in the same manner as in cases of removal with like results as to charges therefor, and in addition it may cause the people in the neighborhood to remove from the vicinity of the infected house and take any and all other needed action to insure the safety of the citizens. The removal or care of infected persons as herein provided, shall be effected by an application made to a civil magistrate in the manner provided for the removal and abatement of nuisances, who shall issue his warrant as directed in such cases, requiring the officer to remove such person, or take possession of condemned houses or lodgings, and provide nurses, attendants. and other necessities for the care, safety and relief of the sick, which warrant shall be executed under the direction of the board of health.

Contagious disease. Care of the sick.

Expense of quarantine; how paid.

Removal of the sick.

SEC. 2571. Local boards of health shall meet for the transaction of business on the first Mondays of April and October in each year and at such other times as may seem necessary. They shall give notice of all regulations adopted by publication thereof in some newspaper, printed and circulated in the town, city, or township, or if there is none, by posting a copy thereof in five public places therein, and through their physician or clerk, shall make general report to the State Board at least once a year and special reports when it may

Local boards; meetings of.

Regulations of. Notice given.

Must report to State Board.

demand them, of its proceedings and such other facts as may be required on blanks furnished by and in accordance with instructions from it. All expenses incurred in the enforcement of the provisions of this chapter, when not otherwise provided, shall be paid by the town, city, or township, in either case all claims to be presented and audited as other demands. In the case of townships the trustees shall certify the amount required to pay such expenses to the board of supervisors of the county, and it shall advance the same, and at the time it levies the general taxes, shall levy on the property of such township a sufficient tax to reimburse the county, which, when collected, shall be paid to and belong to the county.

Expenses of local boards—how paid.

SEC. 2572. Local boards of health shall obey and enforce the rules and regulations of the State Board; and peace and police officers within their respective jurisdictions, when called upon to do so by the local boards, shall execute the orders of such board.

Must enforce rules of State Board

SEC. 2573. Any person being notified to remove any nuisance, source of filth, or cause of sickness as in this chapter provided, who fails, neglects, or refuses to do so, after the time fixed in such notice, or knowingly fails, neglects, or refuses to comply with and obey any order, rule, or regulation of the State or local board of health, or any provision of this chapter after notice thereof has been given as herein provided, shall forfeit and pay the sum of twenty dollars for each day he refuses such obedience, or for each day he knowingly fails, neglects, or refuses to obey such rule or regulation, or knowingly violates any provision of this chapter, to be recovered in an action in the name of the clerk of the board, and when collected to be paid to the clerk of the town, city, or township, as the case may be, and for its benefit; and in addition thereto, any one so offending or knowingly exposing another to infection from any contagious disease, or knowingly subjecting another to the danger of contracting such disease from a child or other irresponsible person, shall be liable for all damages resulting therefrom, and guilty of a misdemeanor.

Regulations. Penalty for violations of.

Penalty—recovery of.

Exposure to infection. Penalty.

SEC. 2574. The Secretary of the State Board of Health shall receive such salary as the State Board shall fix, not to exceed twelve hundred dollars yearly, payable upon the certificate of the President to the State Auditor, who shall issue his warrant for the amount due upon the State Treasurer. Each member of the Board shall receive only actual traveling and other necessary expenses incurred in the performance of his duties, such expenses to be itemized, verified, certified, audited, and a warrant drawn therefor in the same manner as the Secretary's salary.

State Board. Compensation. Salaries.

SEC. 2575. The sum of five thousand dollars, or so much thereof as may be necessary, is annually appropriated to pay the salary of the Secretary, expenses of the Board, contingent expenses of the Secretary's office, and all costs of printing; all such contingent and miscellaneous expenses to be itemized, verified, certified, audited, and paid as other expenses of the Board.

State Board. Appropriation for.

INSPECTION OF PETROLEUM PRODUCTS.

CHAPTER 11, TITLE 12.—CODE.

SECTION 2503. The Governor shall appoint such number of inspectors of the products of petroleum as may be determined by the State Board of Health, not to exceed fourteen in number. Each inspector shall be a resident of the State and not interested directly or indirectly in the manufacture or sale of products of petroleum. His term of office shall begin on the first day of July in each even numbered year. He shall give bond to the state in the penal sum of five thousand dollars, conditioned for the faithful performance of his duties, with sureties who shall in addition to the usual justification, make oath, entered on the bond, that they are not directly or indirectly interested in the manufacture or sale of products of petroleum for illuminating purposes, which bond shall be for the benefit of all persons injured through the failure of the inspector to perform his duties, and shall be filed with, and the sureties thereon approved, by the Secretary of State.

SEC. 2504. The State Board of Health shall make rules and regulations for the inspection of petroleum products, for the government of inspectors, and prescribe the instruments and apparatus to be used. Such rules and regulations shall be approved by the Governor, and when so approved shall be binding upon all inspectors.

SEC. 2505. Each inspector shall be furnished, at reasonable expense to the state, with the necessary instruments and apparatus for testing, and shall promptly make inspection, and test and brand all illuminating oils kept for sale, and for such purpose may enter upon the premises of any person. He shall reject all oils for illuminating purposes which will emit a combustible vapor at a temperature of one hundred and five degrees, standard Fahrenheit thermometer, closed test, not less than one-half pint of oil to be used in the flash test. If upon test and examination the oil shall meet the requirements, he shall brand over his official signature and date the barrel or package holding the same, "Approved, flash test..... degrees," inserting in the blank the number. Should it fail to meet the requirements, it shall be branded under his official signature and date, "Rejected for illuminating purposes." All inspection shall be made within the State, and paid for by the person for whom the inspection is made, at the rate of ten cents per barrel, fifty-five gallons for this purpose constituting a barrel, which charge shall be a lien upon the oil inspected, and be collected by the inspector, reported and paid into the State treasury, except as otherwise provided in this chapter. For the purposes of this act gasoline, benzine and naphtha shall be deemed illuminating oil. No gasoline shall be sold, given away or delivered to any person in this State until the package, cask, barrel or vessel containing the same has been plainly marked "Gasoline."

SEC. 2506. Each inspector shall keep an accurate record of all oils inspected and branded, the number of gallons, the number and kind of barrels or packages, the date and number of gallons approved, the number rejected, the name of the person for whom inspection was made, and the amount of money received therefor, the necessary traveling expenses incurred, the amount expended for instruments and apparatus, and the expenses incurred in prosecutions, which record at all reasonable times shall be open to public inspection. A copy of this record for the preceding month shall be filled with the Secretary of State on or before the fifteenth day of each month, and no item of expenses shall be allowed and paid not shown in such reports.

SEC. 2507. Each inspector shall be allowed as full compensation for his services all fees and commissions earned and collected by him up to fifty dollars per month, and twenty-five per cent of any sum collected in any one month in excess of fifty dollars, but in no case shall his compensation exceed one hundred dollars per month. He shall be allowed such other sum as he necessarily expends for prosecutions incurred in the discharge of his duties and for necessary help in branding barrels. All money collected by the inspector in excess of the allowance herein provided shall on or before the fifteenth day of each month be paid to the State Treasurer. Should any inspector pay out more money in any one month for necessary expenses incurred for prosecutions for the violation of the provisions of this chapter, or for necessary help in branding barrels, than fees collected, such excess shall be refunded to him on his filing a sworn itemized statement with the Governor, showing fees collected and expenses paid or incurred, which statement must be approved by the Governor.

SEC. 2508. If any person, company or corporation, or agent thereof, shall sell, or attempt to sell, any product of petroleum for illuminating purposes which has not been inspected and branded as in this chapter provided, or shall falsely brand any barrel or package containing such petroleum product, or shall refill with products of petroleum barrels or packages having the inspector's brand thereon, without erasing such brand and having the contents thereof inspected, and the barrel or package rebranded, or shall purchase, sell or dispose of any empty barrel or package without thoroughly removing the inspection brand, or shall knowingly or negligently sell, or cause to be sold, or shall use or cause to be used, any product of petroleum mentioned in this chapter not inspected and tested, except as otherwise authorized herein; or if any person shall adulterate with any substance for the purpose of sale or use any product of petroleum to be used for illuminating purposes in such a manner as to render it dangerous, or shall sell or offer for sale, or use any product of petroleum for illuminating purposes which will emit a combustible vapor at a temperature of less than one hundred and five degrees, standard Fahrenheit thermometer, closed test, except as otherwise provided in this section, for illuminating railway cars, boats and public conveyances, and except that the gas or vapor thereof shall be generated in closed reservoirs outside the building to be lighted thereby, and except the lighter products of petroleum at a specific gravity of not less than seventy nor more than seventy-five degrees when used in the Welsbach hydro-carbon incandescent lamp, and for street light by street lamps; or if any common carrier shall receive for transportation or transport in the State as freight any oil or fluid, whether composed wholly or in part of petroleum or its products, or of any substance which will ignite at a temperature of three hundred degrees Fahrenheit thermometer, open test; or if any such carrier of passengers shall burn any oil or fluid which will ignite at a temperature of three hundred degrees for lighting any lamp, vessel or fixture of any kind in any railway passenger, baggage, mail or express car, or boat or street railway car, stage-coach, or other means of public conveyance, or if any inspector shall falsely brand any barrel or package, or shall practice any fraud or deceit in office, or be guilty of any official misconduct, or culpable negligence to the injury of another, or shall deal or have any pecuniary interest, directly or indirectly, in any oils or fluids sold for illuminating purposes while holding such office, he or such person, company, corporation or agent, shall be liable in a civil action for all damages which may be sustained on account thereof, and each such inspector shall be fined in a sum not less than ten dollars nor more than one thousand dollars, or imprisoned in the county jail not exceeding six months, or be punished by both fine and imprisonment.

SEC. 2509. It shall be the duty of the Governor to remove from office an inspector who is incompetent or unfaithful in the discharge of his official duty or, having knowledge of the violation of any of the provisions of this chapter, shall neglect or refuse to prosecute the offender.

SEC. 2510. The Secretary of State shall make and deliver to the Governor a report for the fiscal period ending on the thirtieth day of June in each odd-numbered year, of all inspections made, the receipts and expenditures therefor, and such other items as are by this chapter required to be made of record.

TO PROHIBIT THE USE OF IMPURE OIL IN COAL MINES.

CHAPTER 9, TITLE 12.—CODE.

SECTION 2493. Only pure animal or vegetable oil, paraffine, or electric lights, shall be used for illuminating purposes in any mine in this State, and for the purpose of determining the purity of oils the State Board of Health shall fix a standard of purity, and establish regulations for testing said oil, and said standard and regulations, when so determined, shall be recognized by all the courts of this State.

SEC. 2494. Any person, firm or corporation, either by themselves, agents or employès, selling or offering to sell for illuminating purposes in any mine in this State, any adulterated or impure, or oil not recognized by the State Board of Health as suitable for illuminating purposes as contemplated in this chapter, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than twenty-five dollars, nor more than one hundred dollars for each offense; and any mine owner or operator who shall knowingly use, or any mine operator who shall knowingly permit to be used, for illuminating purposes in any mine in this State, any impure or adulterated oil, or any oil the use of which is forbidden by this chapter, shall upon conviction thereof be fined not less than five dollars nor more than twenty-five dollars.

SEC. 2495. It shall be the duty of the State Mine Inspector, whenever he has reason to believe that oil is being used, or sold, or offered for sale in violation of the provisions of this chapter, to take samples of the same and have them tested or analyzed, and if they are found to be impure he shall make complaint to the county attorney of the county wherein the offense is committed, who shall forthwith commence proceedings against the offender in any court of competent jurisdiction. All reasonable expenses incurred in testing or analyzing oil under the provisions of this section, shall be paid by the owner of the oil whenever it shall be found that he is selling or offering to sell impure oil in violation of the provisions of this chapter. Such costs may be recovered in a civil action, and in criminal prosecutions under this act such expense shall be taxed as part of the costs.

SEC. 2496. The provisions of this chapter shall apply only to coal mines.

PREFATORY.

The statute creating the State Board of Health makes it the duty of the Secretary of the Board, in the biennial report to the Governor, to "include so much of the proceedings of the Board, such information concerning vital statistics, such knowledge respecting diseases, and such instruction on the subject of hygiene as may be thought useful by the Board, for dissemination among the people, with such suggestions as to the legislative action as they may deem necessary."

In compiling this Ninth Biennial Report I have endeavored strictly to conform to the statutory requirement. A glance at the table of contents, but especially a careful perusal of the subjects considered, will show that nearly every phase of sanitary knowledge has been practically exploited.

Attention has been called to the various infectious diseases, the causes producing them and the best methods of prevention; to the means by which these diseases are spread; to the similarity of certain diseases of animals to diseases affecting the human family; to the responsibility of physicians respecting the spread of diseases; to hygiene in the public schools, and the relation of the physician to such schools; to veterinary science and its relation to the public health; to the care of the insane, and the dangers of substituting county care for State care in such cases; to food poisoning; to river pollution; to diseases of animals, etc.

There are extended and important articles upon milk; flour—white vs. dark, or whole wheat, flour; and upon formaldehyde, the new disinfectant.

The articles presented in the report represent the best and latest thought of the Board, and of sanitarians generally, upon the subjects presented; and if they were read by the people of the State, duly considered and the practical suggestions heeded, the State would be amply reimbursed for any outlay of money connected with the maintenance of the State and local boards of health.

The attention of the legislature is especially invited to "Legislative Suggestions," found on page 346. The suggestions made are highly important to the interests of efficiency, economy and uniformity.

Grateful acknowledgment is hereby made to Mr. L. F. ANDREWS for valuable assistance in the preparation and publication of this report.

J. F. KENNEDY,
Secretary.

September 15, 1897.

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MEETINGS OF THE BOARD.

AUGUST MEETING, 1895.

Pursuant to adjournment the Board convened at the capitol, August 1, 1895. There were present Drs. Guilbert, Scroggs, Becker, Emmert, Carter and Shrader, Prof. M. Stalker, State Veterinary Surgeon, and Warren Dickinson, civil engineer.

The quarterly report of the Secretary was read and referred to the standing committees.

UNWHOLESOME MEAT.

The following communication was presented to the Board and referred to a special committee.

SIOUX CITY, Iowa, July 2, 1895.

J. F. Kennedy, Secretary, Des Moines, Iowa:

DEAR SIR—Has the State Board of Health ever taken any action in regard to the wholesomeness or unwholesomeness of the flesh of pregnant cows and other neat animals?

The Bureau of Animal Industry has formulated rules for its inspectors at the abbattoirs, among which is one directing them to condemn all cows over eight months advanced in pregnancy and sows over fourteen weeks.

This worked all right as long as they required the packers to tank all condemned animals, but they issued a rule that went into effect the 1st, whereby the packer can sell all such animals within the State where his plant is located, so that the State wherein a plant is located, virtually becomes the dumping ground for diseased and unwholesome meat from the surrounding States. For illustration: Yesterday, at one of the packing plants of this city a cow was slaughtered that was over eight months advanced in pregnancy. The carcass was condemned by the government inspector and stamped with U. S. condemnation tags, but the packer, instead of sending it to the tank, as was formerly done, sold it to a local butcher. Now the question arises, is there any law or ruling of the State Board of Health that would justify me, as city meat inspector of this city, in condemning and destroying said carcass?

If there is any authority for the condemnation of such meats I would gladly cause its destruction, but at the present time our city attorney is unable to give me light on the subject.

An early reply will greatly oblige. Respectfully yours,

G. A. JOHNSON,
City Veterinarian.

The committee to whom the communication was referred reported the following rule and recommended its adoption, and it was adopted:

"We recommend placing the limit of pregnancy after which the carcass may not be used for food at seven months for cows, and ten weeks for sows."

TRANSPORTATION OF CATTLE.

Professor Stalker recommended that certain regulations for the transportation of cattle adopted by the Board December 28, 1894, be rescinded, as the statute relating to the State Veterinary Surgeon covers the points regulated thereby. The recommendation was adopted. The regulations rescinded are as follows:

RULE 1. All neat cattle that have been reared, or kept south of the parallel forming the north boundary of Indian Territory, or thirty-seven degrees north latitude, and have not subsequently been kept continuously at least one Winter north of said parallel, and which may be brought within the limits of this State between the first day of April and the first day of November following, except for transportation through the State on railways or boats, shall be subject to quarantine; and all land on which such cattle may have been kept or fed, within the State, shall in like manner be subject to quarantine.

RULE 2. All cattle, as defined in Rule 1, while in transit through this State, which may be removed from any car or boat, within this State, for the purpose of feeding, watering, re-shipment, or other cause whatsoever, shall be confined in yards, stables, or enclosures, separate and apart from all other animals, and no other cattle shall be permitted to come within such yards, stables, or enclosures, or in contact with such quarantined and enclosed cattle.

RULE 3. Between the first day of April and the first day of November following, no cattle whatsoever, except such as are defined in Rule 1, shall be placed within any stable, yard, or other enclosure where cattle have been quarantined under Rule 1, unless such yards, stables, and enclosures have been previously thoroughly cleansed and disinfected.

TUBERCULOSIS AMONG CATTLE.

Professor Stalker reported verbally the progress made at the State College respecting the transmissibility of tuberculosis by heredity, and by the use of milk from tuberculous cows. Though only partially completed, the experiments have determined two facts:

1. Healthy calves taken from non-tuberculous cows, as determined by the tuberculin test, and fed exclusively upon milk from tuberculous cows, became tuberculous.
2. Calves taken from tuberculous cows, as shown by the tuberculin test, and fed on milk from non-tuberculous cows, showed no signs of tuberculosis.

In both experiments the calves were killed when three months old.

The experiments tend to show that milk from tuberculous cows produce the disease, and that tuberculosis is not hereditary.

CIGARETTES.

Dr. Emmert presented a brief paper upon cigarettes, their source, use, and baneful effects, which was accepted, and ordered printed. It will be found in another place in this report.

SMALL-POX.

July 26th a case of small-pox was officially reported about two miles north of Linn Grove, in Douglas township, Clay county. The subject was a male adult who had been exposed to the disease at Etnaville, Ohio, and was said to have been in quarantine. When discovered the disease was in the papular stage. Rigid restrictive measures—isolation, quarantine, and vaccination—were promptly resorted to, enforced and maintained.

PUBLIC WATER SUPPLIES.

A paper from Prof. Floyd Davis on public water supplies was read and referred to the committee. It will be found in another place in this report.

MILK INVESTIGATION.

Prof. J. C. Bay presented a paper upon bacteriological investigations of milk to detect the presence or absence of the tubercle bacillus, to-wit:

To the Iowa State Board of Health:

GENTLEMEN—Immediately after the last meeting of the Board, the State Dairy Commissioner proposed an investigation of the commercial milk at such cities and towns in the State as are under his jurisdiction. The principal object of this examination was to ascertain to what extent the dairy products of this State were contaminated with the generators of tuberculosis.

On other occasions I have laid before you facts in regard to the status of these questions. I am glad to be able to report on original investigations, although it is true that the present ones are not yet completed; but in spite of the necessarily fragmentary nature of this report, I have reached conclusions which may be used in future work. What this report may contain of interest or importance is due to the efficient and intelligent action of the Dairy Commissioner.

For some time complaints appear to have been made at Ottumwa to the effect that the milk supply was not as exemplary as desired. Several samples of commercial milk were found to contain pus, or thus suspected. The health officer, Doctor Baker, had examined various samples and had found pus. Three samples of milk of the infected supply were given me by the Dairy Commissioner, and submitted for examination.

In this instance, as with a few exceptions, in all others, the milk, when received at the Dairy Commissioner's office, was properly marked, and placed for a period of five minutes in the centrifugal machine employed in the Babcock method of butter-fat testing. In recent works of similar kind, such as that of Dr. E. C. Schroeder, of the Bureau of Animal Industry[1] this method has been uniformly employed. The purpose of submitting the milk to centrifugal forces is to collect all sediment and solid matter at the bottom of the glass. It has been demonstrated by Scheurlen[2] that the tubercle bacilli, if dispersed in milk, will be collected at the bottom of the glass, if the milk is rotated in the manner already mentioned, while other bacteria will show the directly opposite, namely, the centripetal tendency.

The three samples received, as mentioned, were examined, and one of them, representing the bottom layer of the milk rotated, was found contaminated with tubercle bacilli and pus.

The milk so contaminated came from the supply of a certain milk dealer. Through the local milk inspector, samples were taken from the individual cows in the herd furnishing the supply. Twenty-two samples were received and numbered, by the milk inspector, from 1 to 22 inclusive: of these, numbers 1, 3, 4, 6, 7 and 10 were contaminated with tubercle bacilli. In no instance the infection was surprisingly great, but so far as I am able to judge, in the absence of facilities for making inoculations upon guinea-pigs, the numbers contained in each of these samples would be able to cause infection, if they should be able to reach such places in the animal system as would be susceptible to their infective and destructive powers.

The results of my study were promptly reported to the milk inspector, with orders to prevent the sale of milk from the six cows whose milk had made a positive response to the test. At the same time the inspector was notified to inspect the dairy and subject the six cows to a minute examination. The inspector promptly paid the required visit and reported as follows: "These cows have been kept continually in the barn for the last five years. Four years ago last February he had a cow in this same end of the barn die of what appeared to them consumption, but they knew nothing of the nature of the disease and paid no attention to it. A year later the cow that stood by her side died in a similar way, but since then they have not lost any; but every one of the cows (whose milk is) now pronounced infected with tubercle bacilli has stood ever since in this same row, and all the other cows in the barn are free."

The appearance of cow No. 1 was thus reported:

"I did discover in this cow, on the inner side of front teat, an indication of a small lump, but manipulation dissipated it. I discovered this when I took samples also."

All the other cows appeared to have healthy looking udders and appeared to be in average good health.

I was, from the beginning of these examinations, perfectly well aware, that examinations of cow's milk for tubercle bacilli were in no way a sure criterion with regard to the distribution of tuberculosis in cattle. The two principal questions around which I am trying to gather explanatory facts, are:

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[1] Investigation concerning bovine tuberculosis, Bull. No. 1, Bureau of Animal Industry U. S. Dep. of Agriculture, p. 75, Washington, 1891.

[2] Arb. a. d. Kais, Gesundheitsamte. VII 269, 1891.

First.—How far the commercial and other dairy milk is contaminated with tubercle bacilli, and

Second.—Under what conditions tubercle bacilli, and probably their toxic products, are found in cow's milk.

Some of the problems involved in these questions cannot be solved unless a small number of infected cows could be studied, and be under close observation for some time. I am thinking, now, especially of the second question. It has been repeatedly stated by Bang, Ernst, Peters, Kellogg and others, that tubercle bacilli may occur in the milk at different periods. Nobody has, so far as I have become aware, studied the conditions or laws governing the presence, or the absence of the bacilli in the milk. It is also an open question if tuberculin will be found in the milk of tuberculous animals at all times. Kellogg[3] states that the bacilli may be distributed throughout the body of diseased animals by the blood vessels, but has not proved this by a single observation. But, as it is true, that the milk of tuberculous cows is more infectious at certain times than at other times, and that the bacilli are found in the milk to-day, but probably not to-morrow, and as this disease is governed, as all other infectious processes, by natural laws, observations and experiments must be able to show under just what conditions the milk is contaminated.

In this regard—the question being one of much importance to both producers and consumers—the authoritative statement of Peters: "That animals with only slightly diseased mediastinal glands are of no immediate danger to other cattle or to the public health," is noteworthy. I believe, however, that intracorporal infection is not so much·dependent—this is in contradiction to Kellogg's views—upon the blood vessels as upon the lymphatic system. Should this be true, infection of the mediastinal glands may be more dangerous than it is considered by Peters. The fact that apparently healthy cows make a positive response to the tuberculin test, and that post-mortems, in many instances, show diseased mediastinal and other lymphatic glands might indicate that the lymphatic system is a pre-eminent factor in intracorporal infection.

I have examined, so far, five hundred and sixty-three samples of milk. Of these, three hundred and fifty-nine were from individual cows, and two hundred and four from herds; that is, composite samples.

The samples were taken in forty or one hundred cubic centimeter bottles, and each bottle was at once marked by the inspector, in such a way that the cow from which it came might be at any time recognized.

First, the inspector took samples from the milk cans belonging to the different dairymen at the place. If any of these samples were found to be contaminated, the herd, or rather, the milk, was kept in quarantine until the individual cows of the same herd had had their milk examined. Those whose milk gave positive response to the test were ordered removed and their milk prohibited from the market.

Of the two hundred and four composite samples, four, that is, about two per cent., were contaminated: and of the three hundred and fifty-nine samples from individuals, fifty-one were contaminated, that is 14$\frac{2}{10}$ per cent. Should I venture to deduct any results from the facts now recorded, I should emphatically say that bacteriological analyses of milk are not sure.

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[3] Tuberculosis, 1896, p. 5.

Prof. E. W. Rockwood, was elected Chemist of the Board until the May meeting.

Prof. Stalker, the Secretary, Dr. Carter, and Mr. Dickinson were appointed to represent the Board at the meeting of the United States Veterinary Association to be held in Des Moines.

NOVEMBER MEETING, 1895.

At the meeting held November 7th, there were present Drs. Guilbert, Carter, Emmert, Conniff, and Becker, Prof. M. Stalker, D. V. S., and Warren Dickinson, C. E.

The Secretary's report for the quarter ending October 31st, was read and referred to the standing committees.

FOOD POISONING.

An extensive and remarkable instance of food poisoning at a wedding feast at Sabula, Jackson county, in September, was reported verbally by the President, Dr. Guilbert, to whom the subject had been referred for investigation as to the cause. He said:

"The Sabula epidemic, from the long and cautious examination made by the State Board's representative, had its origin in the poisoned food taken at the famous wedding by the persons affected. It is in evidence that only those were affected who were at the wedding and ate of the food provided. The disease thus developed presented marked resemblances to typhoid fever, and the post-mortems that were made showed the peculiar abdominal lesions of this disease.

"The evidence, in view of the facts in the case, as we are at present advised, is that the epidemic aforesaid was one of typhoid fever, produced by poisoned food.

"No trichinæ have been found in any of the four examinations made by different experts.

"The poisoned food referred to hereinbefore was unquestionably the chicken."

QUARANTINE EXPENSES.

The Secretary reported a communication from the mayor of the town of Blencoe, in which information was sought as to whether or not the county was liable for expenses of quarantine established and maintained by a mayor in accordance with regulations of the State Board of Health, the local board having neglected or refused to adopt any regulations relating thereto, and where the sick are unable to pay such expense.

The following reply was made thereto, with the concurrence of the Attorney-General:

"The statute, section 16, laws of 1880, chapter 151, as amended by chapter 59, laws of 1892, provides that local boards of health shall make such regulations regarding cause of sickness and quarantine, not in conflict with the regulations made by the State Board of Health, as may be necessary for the public health and safety.

"Sections 21 and 22, *ibid.*, provide that local boards shall provide proper care, food, nurses, medical attendance, etc., for the sick.

"Section 1, *ibid.*, provides that the State Board of Health shall have charge of all matters relating to quarantine, and shall make such rules and regulations as may be necessary for the protection or improvement of the public health, and that it shall be the duty of all officers of the State to enforce such regulations.

"Section 16 also requires the mayor of a city, upon written notice given that any contagious disease exists at any place within his jurisdiction, to forthwith quarantine the same as may be required by the State Board of Health.

"The theory, intent and purpose of the statute is that quarantine of contagious diseases shall be under the immediate control and direction of local boards of health. It requires them to make the necessary regulations therefor. It is mandatory. For neglect or refusal to do so they are unquestionably liable for malfeasance as public officers.

"It is not to be presumed that the object and purpose of the statute shall fail because of the laches of a local board. In fact, it provides for such an emergency when it declares that the mayor of a city shall establish and maintain quarantine in accordance with regulations made by the State Board of Health.

"It is fair to presume the legislative mind had this in view in 1892, when substituting section sixteen for that in the original chapter, which gave no such power or authority to the mayor.

"There can probably be no question as to the liability of the county for expenses of quarantine of contagious diseases and the proper care of the sick incurred by the mayor of a city under regulations made by the State Board of Health, in the absence of regulations made by the local board of health of the city of which he is mayor."

SMALL-POX.

Dr. Nordstrum made a final report of cases of small-pox in Clay county. There were four in all, one fatal, a babe, with lung complications.

One case of small-pox was reported from Dubuque in the person of an employé on a ferryboat. He was at once removed to the pest house, and there were no more cases.

STILL-BIRTHS.

The Board was asked for a definite declaration as to what period of utero-gestation a loss of the fœtus should be reported as a "still-birth."

On motion of Dr. Emmert it was decided that the earliest period for reporting a still-birth should not be prior to the seventh month of *utero-gestation.* For the purposes of vital statistics, as contemplated by the statutes, births prior to that period need not be reported at all.

PERSONAL.

Professor Stalker presented the following, which was unanimously adopted:

WHEREAS, The term of office of Dr. Frederick Becker as a member of the State Board of Health is about to expire, we deem it a privilege to express our appreciation of his services.

Resolved, That it is the expression of the Board that in the services of our colleague, Dr. Becker, we have found invaluable help in the work of this body, and the interests of the State have been most faithfully and efficiently served.

Resolved, That we extend to Dr. Becker a cordial expression of our confidence in his ability as a sanitarian, and the faithfulness with which he has met and discharged every official duty.

Resolved, That a copy of these resolutions be spread upon the minutes of the Board, and that a copy also be presented to Dr. Frederick Becker.

AMERICAN PUBLIC HEALTH ASSOCIATION — REPORT OF DR. SHRADER

The report of Dr. Shrader as delegate of the Board to the Denver meeting of the American Public Health Association, was read, accepted, and ordered printed:

To the President of the Iowa State Board of Health:

Your delegate would respectfully submit the following report:

At no time since the organization of the American Public Health Association has there ever been a more profitable meeting held than the present one just concluded at Denver, Colorado.

Without going into details to enumerate all the localities represented, it is sufficient to say that all sections of the United States, Canada and Mexico were represented.

FIRST DAY—TUESDAY, OCTOBER 1ST.

Some sixty-five members of the Association, together with delegates and ladies, met at the Brown Palace Hotel, and were called to order by President Dr. William Bailey, of Louisville, Kentucky, who in well-chosen words congratulated those present on having the privilege of holding this session in the delightful city of Denver.

The usual address of welcome was delivered by Dr. H Sewall, chairman of the local committee of arrangements. Much could be said about this, but time and space will not permit. He said that the duties of the Association were largely in a missionary sense.

It is needless to say that suitable arrangements had been made for social entertainments for delegates and their families.

When the executive committee made its report about sixty or seventy names were presented, desiring to be made members, all of whom were admitted to membership by the unanimous vote of the Association.

The first paper was read by Dr. Josiah Hartzell, of Ohio, member of the Ohio State Board of Health, "The Mississippi River as a Sewer."

I would like to report all the points brought out by Dr. Hartzell, but will be content to bring forward some of his arguments against allowing so much dead animal matter to be floated down the Mississippi. He said the immense quantities of refuse matter which were poured annually into the Mississippi were a constant damage to public health. He spoke of Chicago and the use of Chicago river for sewer purposes. Many comparisons were brought forward showing an estimate of territory drained; also the amount of putrefactive substances, dead animals, etc., that were washed into the river. The effect upon the general health of people in cities located upon the Mississippi: also of residents of Chicago, is apparent. The doctor recommended strict national legislation in regard to polluting streams, which was not only detrimental to public health, but was destroying the fish. He said that the average politician was not a sanitarian, and public health was not very much benefited by his efforts. The new drainage canal at Chicago was mentioned. The disposal of sewage in the larger cities of the world was also mentioned. Fever-plagued cities of some of the States were also mentioned. The doctor spoke of the statutes of Illinois and other States regarding the polluting of streams.

The proper way to correct these evils is to establish a government commission, similar to the English Rivers Pollution Commission, or the Imperial Board of Health. By this means the sanitary condition of navigable waters could be greatly improved. The various State Boards of Health of all the States bordering on the Mississippi are prevented from acting so long as the United States government does not show any interest in the matter. Too much stress can not be placed upon the matter of epidemics caused by polluted streams under government control, passing through the States. The purifying of streams is impractical, so long as the general government does not act in unison with the State Boards of Health. The doctor concluded his paper by recommending Congress to appoint a commission, having charge of the sanitary condition of all navigable streams.

This article was supplemented by a paper: "Water Pollution and Purification of Water Supplies," by Dr. Peter H. Bryce, of Toronto, Secretary of the Provisional Board of Health of Ontario. He brought forth some facts of international interest. He spoke about the city of Buffalo, and criticised authorities for their carelessness in distributing garbage, in order that contractors might be benefited thereby. While cities like Buffalo were being relieved, cities on the opposite side were suffering from the unpleasant effects. The doctor said that it was the duty of both Boards of Health on both sides to regulate the sanitary condition, especially regarding the St. Claire or Detroit river, and the Niagara river.

A general discussion followed the reading of this paper, in which a number of the prominent members took part. All agreed that the national government should take some action in this matter. Many excellent points were brought out and many practical hints were advanced.

FIRST DAY—AFTERNOON SESSION.

In the afternoon the ventilation of railway coaches and car sanitation were discussed. The committee on car sanitation made its report, in which Dr. Conn, of Concord, N. H., chairman of the committee, called attention to the growing interest in this subject. He insisted that employés should be held responsible for the sanitary condition of cars. The Wagner Palace Car company has instituted a school of instruction for train employés. Reports were read showing the sanitary precautions in the care of cars, etc., also drinking water.

An evening session was held in the Trinity Methodist Episcopal church. Governor McIntire delivered an address of welcome to the Association. He was followed by Mayor McMurray. Both gentlemen said many excellent things regarding the mission of our association: others present followed, making excellent remarks. Among them was Chancellor McDowell, who was the last speaker. He impressed his hearers with the expression: Give Public Health the Right of Way."

THE SECOND DAY—WEDNESDAY.

The Association met at Brown's Palace Hotel, many more being present than on previous day. The chairman of the local committee of arrangements gave an outline of various trips and excursions, together with certain social festivities. A number of new members were then admitted to the Association.

It is hardly necessary to mention in detail the discussion which took place, regarding the transmission through the mails of certain bacteriological specimens, when properly prepared. A resolution was introduced asking the Postmaster-General to permit these specimens to be carried through the mails; and samples of tubes were exhibited, also cases which had been devised by Dr. Mitchell for the purpose of conveying these specimens. These tubes and cases have been tried and proved successful. The resolution was unanimously adopted.

Timely notice was taken of the death of Louis Pasteur, that prince of investigators, who has done so much to alleviate human suffering. Words cannot express the gratitude manifested by the Association, and a cablegram of condolence was sent to Dr. Roux of Paris, expressing the sympathy of the Association.

The Advisory Council roll-call indicated that nearly all the members were present, representing the different State Boards of Health and the health officers of municipal corporations together with sanitarians throughout North America, and different departments of the United States army and navy.

At this point, I will merely mention the titles of the leading articles:

A paper on "Disinfection in American Cities" was read by Dr. Chas. V. Chapin, of Rhode Island. This was full of choice meat for the thinking mind. No one can imagine the amount of infected material used in the manufacture of bedding. Dr. Chapin called particular attention to this. He spoke of the different methods of disinfecting. The use of steam and a solution of bichloride of mercury was recommended.

In the manufacture of bedding, Mr. George J. Kendall, of Denver, was given the privilege of addressing the Association. He is a manufacturer of bedding, and he furnished a true sample, or collection of rags which were a sight to behold, and stated in no uncertain language that they were a fair sample of what was used in the manufacture of matresses. If one could see the rags comment would be unnecessary. This is dangerous and quite likely to breed disease. The Association was asked to investigate the manufacture of bedding. Mr. Kendall said he had labored for years to bring about reform in this matter, stating that he had visited the various health officials of the leading cities in this country and England, requesting their coöperation. He spoke of the various comforters, manufactured from shoddy rags. He estimated that four-fifths of the bedding is made from this stuff. A national law governing the sale of these goods, or their manufacture would greatly help in preserving the public health.

In this connection it might be well to call attention to a matter which was referred to by Mr. Kendall. It is an extract from one of the Chicago papers. A striking example is here furnished, and shows the precaution taken in regard to the fumigation of the mail from the Orient. Right here may be asked the question: What are we doing to prevent disease from being spread by the use of old rags for bedding?

Before presenting the article referred to above, I want to say that it seems to me that many of the so-called epidemics of certain diseases might be traced to the use of old rags for bedding purposes. If the United States mails from the Orient are to be fumigated, what about the present system of gathering up old rags to be manufactured into bedding? I believe that the enemy found in old rags is many times greater than the mails could possibly be.

ARTICLE FROM CHICAGO PAPER.

"Orient mail to be fumigated.—Passengers landed from the Gaelic after being inspected.—San Francisco, September 20.—The steamer Gaelic, which arrived this morning from Hong Kong and Yokohama, did not stop at Honolulu. She brought eleven passengers from Hiogo, the worst infected port of the Orient. No sickness was reported on the trip across and no alarm was felt by the ship's officers. Since last advices there has been an increase of the cholera plague in the Oriental ports. During the two weeks preceding the sailing of the ship there has been six deaths from cholera in Hong Kong, fifty-one deaths out of fifty-four cases at Fagasaki, two hundred and fifty-six deaths out of three hundred and twenty-nine cases at Hiogo and twenty-seven cases with nineteen deaths at Yokohama. After inspection by members of the Board of Health, the passengers and mail were landed and the steamer returned to quarantine.

"The postmaster to-day received instructions from Washington in regard to his suggestion directing him to fumigate all mails received from infected ports.

"The chief of police to-day ordered a house to house canvass for the purpose of compelling all citizens to put their houses in the best sanitary condition possible."

All this is in right lines, but Mr. Kendall closed by asking that this one source of contagion might receive attention.

"Microscopic Diagnosis of Diphtheria by a New Staining Method," was the title of a paper read by Dr. H. C. Crouch, of Denver, a member of the State Board of Health of Colorado. This was an interesting paper, which entered into detail regarding a new method of staining the diphtheria bacillus. The writer viewed with pleasure the slides prepared by Dr. Crouch. The discussion brought out many interesting points.

SECOND DAY—AFTERNOON SESSION.

The first paper read was by Dr. Jackson, of Colorado, his theme being: "Suggestions as to Ocular Hygiene in the Schools." The doctor said that children were not taught how to use their eyes. The three prominent points brought out by this paper were:

(1) The training of children in the use of their eyes.

(2) General supervision of school-room work, as to the manner in which children use their eyes should be constant.

(3) More attention should be paid to the lighting of school-rooms.

In the discussion it was stated that children were permitted to stoop over their desks. A changing of the focus of the eye from blackboard to book was mentioned as one cause of trouble of the eyes of school children. One fact was distinctly brought out, which was, that little attention was paid to bringing out the children's physical powers, and their capabilities to think, see, hear and feel. Shiny blackboards were shown to be detrimental to the eyes. I see that I shall only have time now to mention some of the more important articles, for I cannot mention all.

Dr. Wilbur, of Lansing, Mich., read a paper entitled: "On the Outlook for a General System of Registration of Vital Statistics in the United States."

This concluded the second day's proceedings.

THIRD DAY—THURSDAY.

During the morning the Advisory Council held a session, and the first announcement was the report of the Executive Committee on Resolutions offered by Dr. Wilbur during the preceding afternoon, which the committee recommended to be referred to the Committee on Nomenclature of Diseases and forms of Statistics.

The first paper was by Dr. Munn, of Denver, entitled: "National Legislation for the Care of the Public Health."

This was a well written paper and was well received, and was followed by proposing a bill for national legislation, entitled: "An act to Establish Laboratories of Hygiene in Connection with State Boards of Health Existing by Law in the Several States."

It is to be hoped that our national congress will take due recognition of the necessity of national legislation on this important subject.

Dr. A. W. Suiter, of New York, presented a paper: "On the Disposal of the Dead, Having Special Reference to the Prevalent Practice of Embalming."

The title of this article is sufficient to guarantee that much of interest was brought out.

A paper on "Medical Inspection of Schools" was presented by Dr. S. H. Durgin.

Dr. S. E. Solly, of Colorado Springs, Colo., read a paper "On the Influences Peculiar to High Altitudes." This concluded the third day's proceedings.

FOURTH DAY—FRIDAY.

The various committees were appointed for the ensuing year, also reports of committees were received.

Dr. E. Liceaga, of the City of Mexico, presented a most interesting paper, entited "A Contribution to the Study of Yellow Fever in Connection with its Medical Geography and Prophylaxis, in the Mexican Republic." "Prohylaxis of Yellow Fever" was the title of a paper read by Dr. Valle, of Mexico.

Dr. Mendizabal presented the theme: "On Baths: their Necessity, their Influence in Economy; the Dangers they Present, and the Methods of Preventing Them." Dr. Mendizabal was one of the representatives from Mexico.

"Small-pox in Wisconsin from January, 1894, to June, 1895," was discussed by Dr. Wingate, of Milwaukee, Wis.

The closing scenes were agreeable to all, and thus closed one of the most profitable seasons ever held.

MILK INSPECTION.

The recommendation of the Secretary relative to the adoption by the Board, of regulations for the inspection of milk, was referred to a special committee with instructions to report at the February meeting.

FEBRUARY MEETING, 1896.

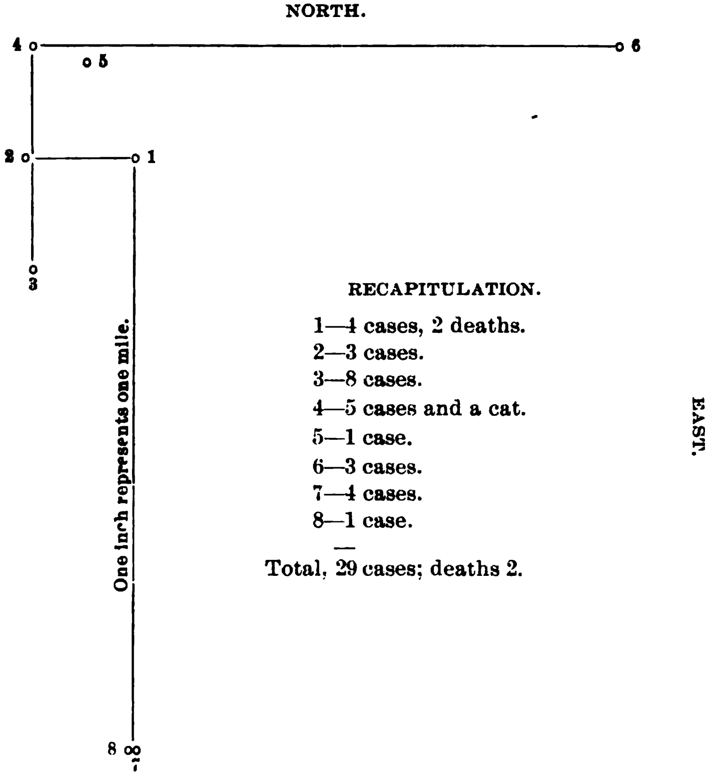
The Board convened February 5th.

There were present Drs. Guilbert, Shrader, Becker, Emmert, Carter, Scroggs, and Conniff; Prof. Stalker, State Veterinary Surgeon; and Warren Dickinson, Civil Engineer.

The Secretary presented his quarterly report which was considered *seriatim*.

ANTI-TOXIN AS A PROPHYLACTIC.

Dr. Emmert presented a detailed report of an outbreak of diphtheria in Guthrie county, as furnished him by Dr. I. S. Crosby, of Menlo, respecting the beneficial effects of anti-toxin as a prophylactic. The following diagram shows the point of incidence, "1," and progress to "8."



RECAPITULATION.

1—4 cases, 2 deaths.
2—3 cases.
3—8 cases.
4—5 cases and a cat.
5—1 case.
6—3 cases.
7—4 cases.
8—1 case.

Total, 29 cases; deaths 2.

1. *Mr. L.* October 24th, two fatal cases of diphtheritic croup. October 25th and 27th, two cases of diphtheria. Both recovered.

2. *Mr. N.* October 25th, three cases. Recovered.

3. *Mr. C.* November 10th–December 1st, eight cases. Recovered.

4. *Mr. C.* December 18th, five cases. Recovered. Also a cat in the family died of diphtheria. The others were killed and the dog disinfected.

5. *Neighbor one-fourth mile east.* December 28th, one case. Recovered. In this family three other cases were immunized.

6. *Aunt of case at No. 5.* January 13th and three weeks later, a brother and sister of her's took sick. The three recovered.

7. *Mrs. G.* January 1st Mrs. G. took sick, the next day two sons aged fifteen and twelve years were attacked, and January 25th the husband, aged forty-five. All recovered. A child of ten in this family was immunized by anti-toxin.

8. *Mrs. W.* Across the road from Mrs. G., aged thirty-two. Recovered. Her four children (aged one and a half, three, five and seven years) were protected by anti-toxin.

The doctor reports that he was able to get a satisfactory history of exposure in every case.

Seventeen of the severer cases were treated with anti-toxin, all recovering promptly except the first two, a boy of fourteen and a girl of eleven years of age, suffering with diphtheritic croup, in both of which prognosis was "hopeless" from the start. Anti-toxin was used as a prophylactic successfully as follows: At No. 4, three children; at No. 7, one child; at No. 8, four children.

Dr. Emmert stated that he saw several of these children in consultation.

Dr. Guilbert made a supplementary verbal report relative to the Sabula food-poisoning case. He said that he had received several communications relative to the subject, yet nothing had been developed to change his opinion expressed at the last meeting of the Board, as to the character and cause of the sickness.

A bill relating to the government of plumbers was presented to the Board and referred to a committee, who reported that while they are heartily in favor of legislation in that direction the bill is impracticable, and it was recommended that further consideration be given the subject.

A bill for the regulation of embalming was presented for consideration. The Board expressed itself in favor of all legislation designed to protect the public health, but was unable at this time to give the measure the consideration necessary for a correct conclusion as to its merits.

The session was principally devoted to a consideration of the Code Commissioner's revision of the statute relating to the State Board of Health. Several amendments were adopted and recommended to committees of the House and Senate.

Rule 16 of the Board respecting the inspection of illuminating oil was rescinded. The rule is as follows:

RULE 16. In all cases of dispute between an inspector and a dealer as to a test oil, the question, together with a sample of the oil in dispute, must be sent to the office of the State Board of Health for adjudication. The sample must be so marked as to be readily identified.

MAY MEETING, 1896.

The annual meeting of the Board was held May 12th.

There were present Drs. Guilbert, Emmert, Shrader, Conniff and Carter, and Warren Wilkinson, civil engineer. Dr. Walton Bancroft, of Keokuk, was presented as the successor to Dr. Becker, and James I. Gibson, D. V. S., as the successor to Professor Stalker. Upon satisfactory evidence of their having duly qualified, they were seated, and participated in the work of the Board.

The Secretary presented his quarterly report, which was received and referred to the standing committees by subjects.

HEALTH LAWS.

The following bills relating to the public health, which had been enacted by the legislature, were laid before the Board:

I.

AN ACT to Prohibit the Manufacture and Sale of Cigarettes, Cigarette Paper and Cigarette Wrappers, and Provide Penalties for Violations of the same.

Be it Enacted by the General Assembly of the State of Iowa:

SECTION 1. No one by himself, clerk, servant, employé, or agent, shall for himself or any person else, directly or indirectly, or upon any pretense, or by any device, manufacture, sell, exchange, barter, dispense, give, in consideration of the purchase of any property, or of any services, or in evasion of the statute, or keep for sale any cigarettes or cigarette paper, or cigarette wrappers, or any paper made or prepared for the purpose of making cigarettes, or for the purpose of being filled with tobacco; or own, or keep, or be in any way concerned, engaged or employed in owning or keeping any such cigarettes, or cigarette papers, or wrappers with intent to violate any provisions of this chapter, or authorize or permit the same to be done.

SEC. 2. Whoever is found guilty of violating any of the provisions of the preceding section: for the first offense shall pay a fine of not less than twenty-five nor more than fifty dollars, and costs of prosecution, and stand committed to the county jail until such fine and costs are paid; for the second, and each subsequent offense, he shall pay, upon conviction thereof, a fine of not less than one hundred dollars, nor more than five hundred dollars, and costs of prosecution, or be imprisoned in the county jail not to exceed six months; *provided*, that the provisions of this act shall not apply to the sales of jobbers doing an interstate business with customers outside the State.

Takes effect July 4th.

II.

AN ACT to Prevent Blindness, and for the Care of Infants Affected With Disease of the Eyes, and to Provide a Penalty for the Violation Thereof.

Be it Enacted by the General Assembly of the State of Iowa:

SECTION 1. Should one or both eyes of an infant become inflamed, or swollen, or reddened at any time within two weeks after its birth, it shall be the duty of the midwife, parent, guardian, or nurse, or other person having charge of such infant, to report within six hours after discovery thereof by such person in charge of such infant, to the health officer or some legally qualified medical practitioner of the city, town or district in which the parents of the infant reside, the fact that such inflammation or swelling or redness of the eyes exists.

SEC. 2. It is hereby made the duty of attending physicians and midwives to instruct parents and nurses in regard to the provisions of this act, and the danger of sore eyes in infants.

SEC. 3. Any failure to comply with the provisions of this act shall be punished by a fine not less than twenty-five dollars, nor more than one hundred dollars, or imprisonment not to exceed thirty days, or both.

SEC. 4. This act being deemed of immediate importance shall be in force and take effect on and after its publication.

III.

AN ACT to Punish the Keeping and Maintaining of Resorts for the Sale and Use of Opium and its Preparations.

Be it Enacted by the General Assembly of the State of Iowa:

SECTION 1. That any person who shall keep and maintain any shop, house, room or other place, to be resorted to by other persons, in which opium or any of its preparations or compounds is sold, or given away to be smoked or used in such place, or who allows opium or any of its preparations to be smoked in such house, shop, room or other place, and every person who resorts to any such house, shop, room or other place for the purpose of smoking opium or its preparations and compounds, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not exceeding five hundred dollars, or by imprisonment in the county jail not exceeding six months, or by both fine and imprisonment.

IV.

AN ACT relating to the State Board of Health.

Be it Enacted by the General Assembly of the State of Iowa:

SECTION 1. That chapter 151 of the Acts of the Eighteenth General Assembly be, and the same is hereby amended by adding after the word "health," in the fifth line of said section, the following, to-wit:

"But no one of the seven physicians appointed shall be an officer or member of the faculty of any medical school in this State, and the Governor shall have the power to remove any member of said Board for good cause shown."

V.

AN ACT to Prohibit the Sale and Use of Impure Oil in Coal Mines and Providing Penalties for Violation thereof.

Be it Enacted by the General Assembly of the State of Iowa:

SECTION 1. That only pure animal or vegetable oil or paraffine shall be used for illuminating purposes in any coal mine in this State. If any person, firm or corporation, either by themselves or agents or employé, shall sell or offer for sale for illuminating in any coal mine in this State any adulterated oil, or any mixture or compound oil, he shall be deemed guilty of a misdemeanor, and upon conviction thereof he shall be fined not less than twenty-five dollars nor more than one hundred dollars for each offense.

SEC. 2. If any mine owner or operator or employe of such owner or operator shall knowingly use, or if any mine owner shall knowingly permit to be used for illuminating purposes in any coal mines in this State, any adulterated, or mixed, or compound oil, he shall upon conviction thereof be fined not less than five dollars nor more than twenty-five dollars for each and every offense.

SEC. 3. It shall be the duty of the State Mine Inspector, whenever he has reason to believe that oil is being used, or sold, or offered for sale in violation of the provisions of this act, to take samples of the same and have them tested or analyzed, and if they are found to be impure he shall make complaint to the county attorney, who shall forthwith commence proceedings against the offender in any court of competent jurisdiction. For the purposes of this act *the State Board of Health* shall fix a standard of purity of oils and regulations for testing said oils, and said standard and regulations when so fixed shall be recognized in all the courts in this State.

SEC. 4. All reasonable expenses incurred in testing or analyzing oil under the provisions of section 3 of this act shall be paid by the owner of the oil whenever it shall be found that he is selling or offering to sell impure oil in violation of the provisions of this act. Such costs may be recovered in a civil action, and in criminal prosecutions under this act such expense shall be taxed as part of the costs.

SEC. 5. Nothing in this act shall be held to prevent the use of electric lights in any coal mine in this State.

SEC. 6. This act being deemed of immediate importance, shall take effect and be in force from and after its publication in the *Iowa State Register* and *Des Moines Leader*, newspapers published in Des Moines, Iowa.

Approved March 19, 1896.

VI.

AN ACT to repeal sections one, two and three, of chapter 79, Acts of the Twenty-first General Assembly, as amended by chapter 67, Acts of the Twenty-second General Assembly, in relation to the spread of disease among swine, and to enact a substitute therefor.

Be it Enacted by the General Assembly of the State of Iowa:

SECTION 1. That sections one, two, and three, chapter 79, of the acts of the Twenty-first General Assembly, as amended by chapter 67, of the acts of the Twenty-second General Assembly, be and the same are hereby repealed and the following enacted in lieu thereof:

SEC. 2. That it shall be the duty of owner or persons having charge of any swine or having knowledge of their dying and upon its coming to his knowledge that any of such swine have died of, or have been slaughtered on account of, any disease, to immediately burn or bury three feet below the surface, the same.

SEC. 3. No person shall sell, or give away, or offer for sale, any swine that have died of any disease, or have been killed on account of any disease.

SEC 4. No person shall convey *along or upon* any public highway or other public ground, or any private land except his own, any diseased swine, or swine that have died of or have been slaughtered on account of any disease. And upon the trial of every information for violation of the provisions of this section, the proof that any person has hauled, or is hauling, dead swine from a neighborhood in which swine have been dying, or are at the time dying from any disease, shall be received and acted upon by the court as presumptive evidence that such swine have been hauled, or are being hauled, in violation of this section.

SEC. 5. It shall be unlawful for any person negligently or wilfully to allow his hogs or those under his control afflicted with any disease to escape his control or run at large.

SEC. 6 Any person convicted of a violation of this act shall be fined in a sum not less than five nor more than one hundred dollars, or by imprisonment in the county jail not to exceed thirty days, or by both fine and imprisonment.

VII.

AN ACT granting the city or town councils the power to prohibit the use of barbed wire for certain purposes, and to provide for the removal of such wire.

Be it Enacted by the General Assembly of the State of Iowa:

SECTION 1. That the council of any city or town may by ordinance prohibit the use of barbed wire to enclose, in whole or in part, any lot or lots within the corporate limits of such city or town, and provide for the removal of such wire now used for that purpose, and further provide penalties for the enforcement of such ordinance.

VIII.

AN ACT raising the age of consent from thirteen to fifteen years of age..

IX

AN ACT relating to plumbing in cities and towns having sewers and a public water supply. and providing for the regulation of the same by the State Board and local boards of health.

X.

AN AMENDMENT to the statute relating to the inspection and branding of the products of petroleum—requiring the branding of all packages, casks, barrels, or vessels containing gasoline, naphtha, or benzine, with the words: "Rejected for Illuminating Purposes."

The foregoing laws were referred to a committee, who submitted the following report;

Your committee on contagious diseases would recommend that the Secretary be instructed to prepare a circular on ophthalmia for distribution.

Your committee would also congratulate the people of this State on the wise and judicious action of our legislature in passing the bill for preventing the sale of cigarettes and against the use of opium as an intoxicant in our State. Respectfully,

J. M. EMMERT,
R. E. CONNIFF,
J. F. KENNEDY,
Committee.

DISEASES OF DOMESTIC ANIMALS.

Dr. Gibson, of the Committee on Diseases of Domestic Animals, presented the following report, which was adopted:

MR. PRESIDENT—Your committee recommend the following:

That all the laws pertaining to the prevention and restriction of contagious diseases of domestic animals be printed in pamphlet form, which shall include:

First.—The laws relative to the shipment of Southern cattle into or through the State.

Second.—The laws relative to the dealing in or shipment of diseased hogs within the State.

Third.—The laws relative to glanders and the disposition to be made of animals thus affected.

Fourth.—That a ruling of the Board be made relative to the disposition of piggy sows rejected by the United States inspectors at the various stock yards within the State.

Fifth.—That the Board, directed by the attorney-general, prepare legal quarantine blanks to be used by the State Veterinary Surgeon and his assistants whenever such quarantine is indicated, in order to prevent the spread of contagious diseases among domestic animals or the transmission of such diseases to the human family.

Sixth.—That the pamphlet contain all of chapter one hundred and eighty-nine of the laws of 1884.

Seventh.—That as there is no evidence of the existence of glanders at Van Meter the matter be passed over.

Eighth.—That the pamphlet contain the laws relative to rabies, and the fact that no damage can be collected from the State or county for animals lost by said disease. Signed, J. I. GIBSON,
WALTON BANCROFT,
E. H. CARTER.

MINERS' OIL.

The committee to whom was presented the statute relating to miners' oil, and the requirements of the Board thereunder, submitted the following report, which was unanimously adopted:

Your committee to whom was referred the formation of rules and regulations governing the use of oil for the illumination of coal mines, and for the use of miners, beg leave to submit the following, and ask its adoption:

RULE 1. The specific gravity of oil used for illuminating purposes in coal mines must not exceed twenty-four degrees Tagliabue hydrometer at sixty degrees temperature Fahrenheit.

RULE 2. All oil must be tested in a glass-footed glass cylinder one and one-half inches in diameter and eight inches deep. If the oil to be tested is below forty-five degrees Fahrenheit temperature it must be slowly heated until it reaches eighty degrees temperature. Should the oil be above forty-five degrees temperature and below sixty degrees it must be heated to seventy degrees, when in either case it shall be well shaken and allowed to cool until a temperature of sixty degrees is reached, when the test must be made.

RULE 3. In testing the gravity of oil the hydrometer must be, when possible, read from below, and the last line which appears under the surface of the oil shall be regarded as the true reading. If the oil is turbid, or opaque, one-half of the capillary attraction shall be taken as the true reading.

RULE 4. Where the oil is tested in difficult circumstances, an allowance of one-half of one degree may be made for error of parrallax.

RULE 5. Paraffine wax shall not contain more than three per cent of oil, and the maximum melting point shall be one hundred and ten degrees Fahrenheit.

To test the melting point of paraffine wax, place a chip of it on hot water, then allow the water to cool slowly, and note the temperature of the water when the wax loses its transparency.

RULE 6. All material used for illuminating purposes in coal mines shall be free from smoke, bad odor, and all by-products of resin known as "Mystic Oil."

RULE 7. In all cases of doubt, or question as to inspection, or as to the purity of oil or paraffine, to be used in mines, a sample of the same shall be furnished the State Mine Inspector for chemical analysis.

J. C. SHRADER,
J. I. GIBSON,
Committee.

ELECTION OF OFFICERS.

The following officers were elected for the ensuing year:

President—Dr. E. H. Carter, Des Moines.

Secretary—Dr. J. F. Kennedy.

Delegates to the American Public Health Association at Buffalo, N. Y., Drs. Carter and Kennedy; to the Iowa Public Health Association, at Davenport, Drs. Shrader and Gibson, and to the National Conference of State Boards of Health, at Chicago, Drs. Guilbert and Scroggs.

Mr. L. F. Andrews was re-elected as assistant to the Secretary and Prof. E. W. Rockwood, of Iowa City, was re-elected chemist to the Board.

The office of bacteriologist to the board was discontinued.

J. F. Kennedy was re-elected editor of the Bulletin.

Dr. Scroggs offered the following resolution, which was adopted by a rising vote:

Resolved, That the hearty thanks of this Board are hereby tendered to Dr. E. A. Guilbert for the courteous and impartial manner in which he has presided over the deliberations of this board during the past year.

Dr. Carter was inducted to his office, and at once announced the following standing committees for the ensuing year:

Auditing—Dickinson, Shrader, Gibson.
Animals—Gibson, Conniff, Guilbert.
Contagious Diseases—Emmert, Shrader, Bancroft.
Corpses—Scroggs, Bancroft, Shrader.
Food and Water—Guilbert, Emmert, Dickinson.
Kerosene—Shrader, Bancroft, Scroggs.
Legislation—The Board.

Library—Emmert, Guilbert, Scroggs.
Plumbing—Dickinson, Guilbert, Conniff.
Publications and Papers—Bancroft, Conniff, Emmert.
Rules and Regulations—Remley, Bancroft, Scroggs.
Schools—Shrader, Guilbert, Conniff.
Ventilation—Conniff, Dickinson, Scroggs.

AUGUST MEETING, 1896.

The Board convened August 6th. All the members were present.

The Secretary submitted his report for the quarter ending July 31st, which was referred to standing committees and subsequently considered *seriatim*.

SANITARY CONVENTIONS.

Dr. Emmert presented the subject of sanitary conventions, and showed the advantages to be derived from holding such conventions in different parts of the State. The subject was referred to a special committee of Emmert Bancroft and Dickinson, to report at the next meeting.

Dr. Shrader made a verbal report of his attendance with Dr. Gibson as delegate to the meeting of the Iowa Public Health Association, held at Davenport.

Dr. Guilbert made a verbal report of his attendance with Dr. Scroggs at the meeting of the National Conference of State and Provincial Boards of Health, held at Chicago, detailing the work done and the questions discussed.

DISINTERMENT OF SMALL-POX BODIES.

An application for permit to disinter bodies dead from small-pox, interred near the Missouri river, was rejected.

IMPURE WATER FOR COAL MINERS.

A communication from Dr. Brunt, relative to the dangerous and repulsive character of the water furnished to coal miners by their employers, was referred to the Committee on Food and Water. Dr. Guilbert, chairman, in behalf the committee, reported as follows:

"The Board has no statutory power in the case, but it can and should advise coal operators that common humanity demands of them the correction of these wrongs. We therefore recommend the letter of Dr. Brunt be referred to the editor of the BULLETIN, with instructions to make a synopsis of the allegations, and on that text to formulate an editorial appealing to the aforesaid mine operators to at once inaugurate such measures as will not only increase but will purify the present drinking water supply of the aforesaid mines."

INSPECTION OF HOGS.

Dr. Gibson presented the following recommendation, which was referred to the committee:

"All hogs presented for the Iowa State Fair and Sioux City Fair shall be subject to examination by the State Veterinary Surgeon before entering the fair grounds, and to daily inspection during the exhibition. Should any animal be found diseased with hog cholera or swine plague, it must be immediately removed to a place of quarantine. The show-pens must be cleansed and disinfected under the supervison of the State Veterinary Surgeon before and during the Fair."

REGULATION OF MIDWIVES.

The secretary presented recommendations relative to the adoption of regulations respecting the practice of midwifery by women. The subject was referred to the standing committee, to report at the next meeting.

TRANSPORTATION OF CORPSES.

A communication was presented from the Secretary of the Western Association of Railroad General Baggage Agents' Association, respecting the regulation of the Board requiring a permit from the Board for the disinterment of corpses, and that no disinterred bodies can be shipped by railroads in Iowa.

The Baggage Association desired to "ascertain what would be necessary in the event of a disinterred body being shipped from points in other States, through the State of Iowa, to points beyond, it being understood that the proper transportation permits would accompany the body, and the State Board of Health of the State from which the body is shipped, and the health authority of the locality to which the body is consigned having consented to the removal; and whether the consent of the above mentioned health authorities would be accepted by the Iowa State Board as sufficient authority for the transportation of disinterred bodies through Iowa."

The following are the rules of the Board:

RULE 1. The transportation of bodies of persons dead of Small-pox, Diphtheria (Membranous Croup), Asiatic Cholera, Leprosy, Typhus Fever, Yellow Fever, or Scarlet Fever (Scarlet Rash), is absolutely forbidden.

RULE 2. The bodies of those who have died of Anthrax, Puerperal Fever, Typhoid Fever, Erysipelas, Measles, and other contagious, infectious or communicable diseases not embraced in Rule 1, must be wrapped in a sheet thoroughly saturated with a strong solution of bichloride of mercury, in the proportion of one ounce of bichloride of mercury to a gallon of water, and encased in air-tight zinc, tin, copper or lead-lined coffin, or in an air-tight iron casket, hermetically sealed, and all enclosed in a strong, tight wooden box; or the body must be prepared for shipment by being wrapped in a sheet and disinfected by solution of bichloride of mercury as above, and placed in a strong coffin or casket, and said coffin or casket encased in a hermetically sealed (soldered) zinc, copper, or tin case, and all enclosed in a strong outside wooden box of material not less than one inch and a half thick.

RULE 3. In cases of contagious, infectious, or communicable diseases, the body must not be accompanied by articles which have been exposed to the infection of the disease. And in addition to permit from Board of Health or proper health authority, agents will require an affidavit from the shipping undertaker, stating how body has been prepared and kind of coffin or casket used, which must be in conformity with Rule 2.

RULE 4. The bodies of persons dead of diseases that are not contagious, infectious, nor communicable, may be received for transportation to local points in this State; when encased in a sound coffin or metallic case, and enclosed in a strong wooden box, securely fastened so it may be safely handled. But when it is proposed to transport them out of the State to an inter-state point (unless the time required for transportation from the initial point to destination does not exceed eighteen hours) they must be encased in an air-tight, zinc, tin, copper, or lead-lined coffin, or an air-tight iron casket, or strong coffin or casket incased in a hermetically sealed (soldered) zinc, copper or tin case, and all enclosed in a strong outside wooden box of material not less than one inch thick. In all cases the outside box must be provided with four iron chest handles.

RULE 5. Every dead body must be accompanied by a person in charge who must be provided with a ticket, and also present a full first-class ticket marked "Corpse," and a transit permit from the Board of Health, or proper health authority, giving permission for the removal, and showing name of deceased, age, place of death, cause of death (and if of a contagious or infectious nature) the point to which it is to be shipped; medical attendant, and name of undertaker.

RULE 6. No disinterred body must be received for transportation, by any railroad, unless accompanied by a special disinterment permit from the State Board of Health, which is additional to the regular transportation permit.

The disinterment permit must be approved by the local board of health of the jurisdiction where the body was interred.

Depositing bodies in a receiving vault is deemed a burial, and a disinterment permit is required for removal.

NOTE.—Local boards should refuse to grant a permit where the cause of death is given as "heart failure," unless the physician states that it was not the result of diphtheria. In case of disinterment, the permit from the State Board of Health must be attached to the transit permit, and delivered to the person in charge of the corpses. If more than one body is shipped at one time, a separate permit must be issued for each body.

Dr. Guilbert presented the following resolution, which was adopted:

"*Resolved*, That the Secretary be, and he is hereby instructed to reply to the Secretary of the Western Association of General Baggage Agents, that the Iowa State Board of Health contemplates making no changes in existing regulations with regard to the transportation of corpses."

The circular on "Blindness of the New Born," was referred to the Committee on Publication, to report at the next meeting.

NOVEMBER MEETING, 1896.

The Board met in quarterly session November 5th. All the members were present.

The Secretary presented his report, which was referred to committees.

INFECTIOUS DISEASES.

The Secretary, for the purpose of demonstrating the importance of quarantining measles, cited from official reports for 1892 and 1893 the mortality in the State from measles, whooping cough, small-pox, diphtheria, and scarlet fever.

For 1892, total number of deaths from all causes, for the entire State, ninety-six hundred and thirty-nine. There were no reports from the following counties: Carroll, Chickasaw, Crawford, Harrison and Osceola, and in this aggregate are not included any deaths from these five counties.

The deaths from the following specified diseases were as follows: Small-pox, none; diphtheria, five hundred and twenty-seven; scarlet fever, one hundred and twenty-nine: whooping cough, seventy-seven; measles, fifty-two; classified by ages as follows: Under five years, thirty-eight; between five and ten years, two; between ten and fifteen years, three; between fifteen and twenty-five years, two; and over twenty-five years, seven. Total, fifty-two.

For 1893 the reports showed a total of ten thousand two hundred and thirty-three deaths, the counties of Chickasaw and Lyon not reporting.

The deaths from the diseases above specified were as follows: Small-pox, five; diphtheria, five hundred and thirty-six; scarlet fever, ninety-three; whooping cough, under five. seventy-four; five to fifteen, one. Total, seventy-five. Measles, under five, fifty-three; five to fifteen, three; fifteen to twenty, four; twenty to twenty-five, two; over twenty-five, two. Total, fifty-four.

It will be seen by the foregoing that for the years 1892 and 1893 in the counties reporting there were in all nineteen thousand eight hundred and seventy-two deaths. Of these deaths, five were from small-pox; one thousand sixty-three were from diphtheria; two hundred and twenty-two were from scarlet fever; one hundred and fifty-two were from whooping cough; and one hundred and sixteen were from measles.

Of the one hundred and sixteen deaths from measles ninety-one were children under five years of age, showing not only that measles is a dangerous disease but that children under five years of age are the principal sufferers.

One health officer reported a case where the body of a person dead from diphtheria was taken to another town. The funeral was held in a church and the entire lid of the coffin was removed. Fortunately but two children were present. The clothing of the deceased child was later worn by a sister and she became infected and died.

AMERICAN PUBLIC HEALTH ASSOCIATION.

Dr. Carter, President, presented the following report as a delegate of the Board, at the meeting of the American Public Health Association, which was printed in the Monthly Bulletin of the Board, and from which the following is reproduced:

The papers read on the first day were important. Drs. Granville P. Conn, President of the State Board of Health of New Hampshire; Domingo Orvananos, of the City of Mexico, Secretary of the Superior Board of Health of the Republic of Mexico, and Thomas Noriega, delegate from the State of Chipias, Mexico, read papers on Passenger Car Sanitation. Many improvements were recommended and among them impermeable paper covers for the water closet to be removed after each visit. Dr. Valentine, of New York, said that in Antwerp he had seen fresh wooden covers supplied to each new occupant of a water closet.

Dr. Frederick Mmontizambert, of Toronto, General Superintendent of Quarantine of the Dominion of Canada, chairman of the Committee on Steamship and Steamboat Sanitation, made a report and called attention to the proposed disinfection of ships by the electrolysis of sea water, a process actually in use by the French. He said an apparatus no larger than a coal scuttle could be connected with the ordinary electric plant by a couple of wires, which was capable of producing three hundred liters of electrolyzed sea water per hour.

No paper during the day attracted more attention than the one read by Dr. Josiah F. Kennedy, on the "Composition and Infectiousness of Milk." It was an exhaustive treatise, was well delivered, and attracted the earnest attention of the Association. He compared breast-fed children with those fed on cow's milk, and attributed a large proportion of deaths to inanition from dilution of the milk with water. He described epidemics due to infected milk and named numerous ways by which the germs are introduced into it. The remedies, he said, are inspection, cleanliness and sterilization. In the course of discussion Dr. Lee, of Philadelphia, said that he preferred fresh milk to sterilized, and thought sterilized milk favored the development of scurvy and rickets. Dr. Holton, of Vermont, called attention to the danger from substituting patent foods for milk.

The evening meeting was called to order by Vice-President Woodhull, and the session was opened by his Honor, Edgar B. Jewett, mayor of the city of Buffalo, who challenged the Association to find fault with the administration of the city's affairs in relation to sanitary matters. He closed his address by offering the sanitarists the freedom of the city and hoping for them a successful convention. The Rev. Dr. Thomas R. Slicer, of the Church of Our Father, was the chief orator of the evening. His address was replete with sound sense and pungent humor. In closing he said: "Let me add, in conclusion, that the health department of any city has no business at that trough from which the politician feeds." The annual address of President Liceaga closed the exercises of the evening. The President's address, as viewed by a body of experienced sanitarians, was an able and forceful paper. It referred to the business of the Association and went into the history of the growth and development of the study of public hygiene in Mexico, which he said had been fostered and encouraged under the administration of President Diaz during the last twenty years. At the mention of the name of President Diaz there was a simultaneous outburst of applause from the large audience. Dr. Liceaga's address covered a wide range of territory, and was read in English. About two-thirds of the papers by the Mexicans were read in French, and some one would immediately follow, giving a synopsis of the paper in English. The remainder of the Mexican papers were read in English, except one, which was read in Spanish, and a translation in English, in pamphlet form, was given to each member to read while it was being read in Spanish by the author.

On the morning of the second day of the Association the inexhaustible and never-to-be-settled subject — The Disposal of Garbage and Refuse — was introduced. Papers were read and the subject was discussed extensively and earnestly.

One could, in his imagination, see that great body move like a deep sea wave with united desire to prevent disease and raise the standard of public health. This was not an assembly of new beginners, but of men of mature minds, many of whom have won fame even in more distant lands.

It was proposed to dispose of garbage by reduction, cremation, by filling in and plowing into the soil, by dumping into seas, lakes or rivers, or by being fed to animals. These various methods were recommended, varying under different circumstances. It was generally believed that kitchen garbage should be disposed of by the kitchen stove. An ingenious device was exhibited to be attached to the stove pipe, in which the garbage could be placed and dried, and used afterward to kindle the fire. It was conceded by all that the swill pail, that harbor for flies and promoter of disease, must go. That flies frequently conveyed the germs of disease from one person to another there seemed to be no doubt.

An apparatus called the Household Crematory, was on exhibition at a place near Ellicott Square, which your representative examined while in active operation. It is of cast iron and steel, handsomely finished, is ornamental in appearance, and occupying small space, being eighteen inches wide, twenty-five inches in length and twenty-five inches in height. It has an opening in the top and a cover like a privy, and may be used for the disposal of garbage, refuse and human excrement. It has a pipe like a stove and may be placed in any part of the house where it can be connected with a chimney. Refuse is placed in the receptacle through the opening in the top. Beneath the receptacle is a fire-box, in which a fire may be made every few days and the refuse consumed. It is said to be entirely odorless. It attracted much attention.

"The Quick or the Dead," was the title of a rather sensational paper read by Dr. Benjamin Lee, of Philadelphia, Secretary of the State Board of Health of Pennsylvania. It contained many sensible suggestions in regard to funerals.

Dr. Durgin, of Massachusetts, recommended steel coffins. The glass coffin was also recommended.

Prevention of blindness was discussed, and a law, such as now exists in Iowa, was recommended.

During the afternoon session many valuable papers were read. Dr. Jones, of Greenwich, Conn., recommended the establishment of a college of Preventive Medicine.

The following resolutions were unanimously adopted:

Resolved, That this Association views with pleasure the growing tendency of many States and Provinces not to manage and control the bureaus of public health by political partisans, and not to exclude from office sanitarians who may differ politically from the party temporarily in power. From a scientific standpoint, as well as in the best interests of the public health, we welcome this tendency, and take this opportunity to place ourselves on record by declaring that it is conducive to the best interests of public health to ignore political lines in the formation of state, provincial and other boards of health.

Resolved, That it is the sense of this Association that the Committee on National Health Legislation be continued and that efforts be continued to influence the Congress of the United States to establish a department of public health at Washington, D. C.

Other resolutions were adopted, and many papers were read during the forenoon. The discussion of formic aldehyde or formaldehyde gas for room and car disinfection was prolonged, and the agent highly recommended.

At the evening session the following papers attracted particular attention: "Alcoholic Drinks, from a Sanitary Standpoint," by Dr. Felix Fermento, of New Orleans, member of the State Board of Health of Louisiana; "The Bicycle in its Sanitary Aspect," by Albert L. Gihon, Medical Director United States Navy (retired); "Public Bathing Establishments." by Dr. H. Lincoln Chase, Brookline, Mass.

The paper of Dr. Fermento favored the habitual use of light drinks as a means of preventing drunkenness. The paper was warmly discussed, and many took the opposite view.

Dr. Gihon's paper on the bicycle, fully commending what he deems to be its proper use and strongly condemning what he deems to be its improper use, was a literary treat.

The public baths were so extensively explained and discussed that time forbids an attempt at doing the subject justice in this report. It was claimed that the simplest form of a public bathing place should be maintained in every town. A small room where a person could take a shower bath. A stone or cement floor is necessary, arranged so that the water can run away. The water should strike the person at an angle, leaving the head untouched, if desired. A wash rag and a towel are necessary, which should not be used a second time until scalded, thus preventing the transmission of disease from one person to another.

The following officers were elected for the ensuing year:

President, Dr. Henry Buckingham Holbeck, of Charleston, South Carolina, Health Officer of the city of Charleston. First Vice-President, Dr. Peter Henderson Bryce, of Toronto, Canada, Secretary of the Provincial Board of Health of Ontario. Second Vice-President, Dr Ernest Wende, of Buffalo, New York, Health Commissioner of the city of Buffalo. Treasurer, Dr. Henry Dwight Holton, of Brattleboro, Vermont. Secretary, Irving A. Watson, of Concord, New Hampshire, Secretary of the State Board of Health of New Hampshire, now in his fifteenth year of office.

CONTAGIOUS DISEASES—MEASLES AND WHOOPING COUGH.

The Committee on Contagious Diseases reported as follows:

We would recommend to the Board for their serious consideration the fact that out of a total of one hundred and sixteen deaths reported to the Secretary from measles in Iowa, ninety-one were under five years of age; and of one hundred and fifty-two deaths from whooping cough, all but one were children under ten years of age—these figures showing that the State Board and local boards should use every effort to educate the people of the State to the danger from these diseases to early childhood. We wish to call the attention of the Board to the imperfect manner of collecting vital statistics, and hence to their utter worthlessness to science

(Signed) J. M. EMMERT,
W. BANCROFT.

QUARANTINE—HEADS OF FAMILIES.

Dr. Emmert submitted the following resolution, which was adopted:

Resolved, That when a family is quarantined for diphtheria or measles, the head of the family, or bread-winner, shall have the privilege of attending to his regular business, and of going to and from his house only when complying with the following conditions:

First.—He shall change his clothing before going to and returning from his place of business.

Second.—He shall wash his hands, face, head and beard with a 2½ per cent solution of carbolic acid, each time after leaving his home to go to his place of business.

Third.—While in the house he shall not act as nurse or live in the same room with the sick person.

Fourth.—He shall not attend any public meeting, or attend any place where persons are congregated.

Fifth.—This privilege shall not be granted to school teachers, or to any person whose business brings him in intimate contact with children.

COMMUNICATIONS.

Dr. Guilbert, chairman of the Committee on Communications, reported as follows:

1. *Investigations Respecting Congenital Deformities*, as recommended by Dr. C. J. Bayer, of Grinnell. The study of congenital, physical and mental

deformities is a far reaching, interesting and important one. The suggestions of Dr Bayer commend themselves to all students of heredity, and this Board would be glad to aid in any manner, consistent with its general duties, in the prosecution of that study. At present, however, your committee do not see the way clear to enter upon a special investigation of the subject.

2. *School Boards v. Local Board of Health.*—In the matter of the communication of Dr. F Y. Lynch, clerk of the board of health of Fairfield, relating to the conflict of action between said board and the school board of the town on the question of compulsory vaccination of the school children, your committee find that the local board of health, having refused or neglected to obey the health laws of the State, it was the duty of the school board to act. We also find that no school board or local board of health has the right or power to decree that certificates of vaccination must be issued by any one physician. The certificate of any physician recognized by the State Board is to be honored by all such boards. Your committee are glad to know that our accomplished legal adviser, the Attorney-General, sustains us on both these points

3. To the query of Dr. F. Robbins, health officer of Neola, we reply, and the Attorney-General again sustains us, that no school board has power to traverse the considerate action of any local board of health respecting quarantine. When the local board of health lawfully releases a child from quarantine, said child must be admitted to school promptly and without question on the part of the school board.

The report of the committee was received and adopted by the Board.

VIVISECTION.

The committee to whom was referred the communication of Dr. Walter Wyman, Surgeon-General, U. S. A., and a copy of a bill before Congress, relating to the practice of vivisection in the laboratories of the Bureau of Animal Industry, submitted the following report, which was adopted:

Your committee having under consideration the proposed legislation by the United States Congress, restricting very materially in the District of Columbia the experiments upon animals by the Bureau of Animal Industry on the ground that vivisection as practiced is a needless cruelty to animals, beg leave to submit the following report: Inasmuch as your committee believe it necessary to continue all lines of scientific investigation and do not believe the scientists engaged in such experiments are guilty of unnecessary cruelty to the animals experimented upon, but are instead benefactors not only to the animal kingdom but to humanity as well, therefore we report in favor of humanity and vivisection, and recommend that this Board instruct the Secretary to inform the chairman of the senate committee that the State Board of Health of Iowa is emphatically opposed to the pending bill (Senate Bill 1552), and entirely in favor of vivisection as carried on at present.

(Signed) J. I. GIBSON,
E. A. GUILBERT,
R. E. CONNIFF.

MIDWIVES.

Dr. Bancroft offered the following report relative to the practice of midwifery in Iowa:

The committee to whom was referred the paper of the Secretary relative to the practice of midwives, reports that it is in complete accord with the suggestions therein contained, and is decidedly of the opinion that rules for regulating the practice of midwives and defining their duties to their patients and the public should be enacted and promulgated.

It appears, however, that the midwives have already complied with the requirements of the law relative to their practice, and the possibility which suggests itself—that under the Medical Practice Act, the State Board of Health is not empowered to enforce such rules and regulations as it might make decided the committee to recommend that before taking further action the opinion of the Attorney-General be secured, as to whether the law does confer upon the State Board of Health authority to make and enforce rules and regulations for the practice of midwives.

WALTER BANCROFT.
J. M. EMMERT.
R. E. CONNIFF.

PERSONAL.

The following resolution was offered by Dr. Conniff and adopted unanimously:

WHEREAS, The term of service of Dr. E. A. Guilbert as a member of this Board will have expired before the next meeting, therefore

Resolved, That the Iowa State Board of Health hereby most cheerfully testify to the great ability and efficiency with which Dr. Guilbert has always discharged every duty connected with the Board. His extensive knowledge, varied experience and mature judgment have been of great service and a continual help to the Board, and whatever of efficiency and progress the Board may have achieved during the last seven years is in no small degree attributed to the wise counsels of Dr. Guilbert.

Resolved, That a copy of these resolutions be spread upon the minutes and published in the IOWA HEATH BULLETIN.

QUARANTINE—CARE OF THE SICK—EXPENSES.

The Secretary presented the following correspondence upon a subject deemed of importance to local boards:

DES MOINES, August 24, 1895.

Hon. Milton Remley, Esq., Attorney-General:

In the MONTHLY BULLETIN for July was given a decision. and the State Board of Health desires to know whether or not, under the statutes, said decision is in conformity with law, and if not wherein. The decision is as follows, to-wit:

"The local board of health employed a physician to attend a family quarantined for diphtheria. The county board of supervisors ordered his dismissal and sent the county physician to attend the cases, and at a meeting of the board adopted the following resolution:

"'*Resolved*, That the trustees of townships and boards of health are hereby notified that except in cases of extreme emergency no bills will be allowed by the board for medical attendance on county poor unless the physician employed by the board has been notified by the board and fails to respond.'

"Has this proceeding of the supervisors any legal force?"

"ANSWER.—County boards of supervisors cannot make regulations in contravention of a statute. The statute has vested the authority to make rules and regulations in regard to quarantine of contagious diseases in the State Board and local boards of health, and prescribes the duties of such boards. It requires that local boards shall make such rules and regulations respecting quarantine as are necessary for the public health and safety. This includes the furnishing of food, nurses, and proper care, when necessary, and medical attendance. With this the county supervisors have nothing to do, and can make no interference with regulations made by a local board in respect to such matters. The presumption of law is that sick persons may employ what physician they please to attend them. The only exception would probably be, paupers, or those under the immediate care of the county.

"The statute also provides that local boards shall regulate the fees and charges of all persons employed by them in the execution of the health laws and their own regulations. The presumption of law is that such fees and charges shall be reasonable and just. This statute is mandatory, and with it county supervisors cannot interfere.

"The statue also provides that the county must pay the expense of such quarantine if the sick are unable to pay. Providing medical attendance is a part of the expense incurred in rendering effectual provision for the safety of the people."

The facts upon which this decision was predicated are as follows: A local board of health of a township had quarantined a family on account of diphtheria, and employed a physician to attend the sick The county board of supervisors dismissed the physician employed by the local board, and sent one of three physicians who had been previously elected by said supervisors as county physicians to attend the poor of the county. The supervisors also refused to allow any compensation to the physician who had been employed by the local board

Section 16, chapter 151, laws of 1880, as amended by chapter 59, laws of the Twenty-fourth General Assembly, provides as follows, to-wit:

"SEC. 16. Local boards of health shall make such regulations respecting nuisances, sources of filth, causes of sickness, rabid animals, and quarantine, not in conflict with regulations made by the State Board of Health, and on board any boats in harbors or ports within their jurisdiction, as may be necessary for the public health and safety. Upon written notice given by any practicing physician, that small-pox, diphtheria, scarlet fever, or any other contagious disease dangerous to the public health exists in any place, it shall be the duty of the mayor of any incorporated city or town, and the clerk of any district township, forthwith, without other authority, to establish quarantine in such cases, as may be required by regulations of the State Board of Health and said local boards, and to maintain and remove such quarantine in like manner. If any person shall violate any such regulation as herein provided, he shall be fined not less than twenty-five dollars for each and every day he knowingly disregards and violates the same, to be recovered by any court of competent jurisdiction. Notice shall be given of all regulations made by said local boards, by publishing the same in a newspaper published in their jurisdiction, or where there is no newspaper, by posting in not less than five public places."

Section 20, *ibid.*, provides:

SEC. 20. Whenever the Board of Health shall think it necessary for the preservation of the lives or health of the inhabitants to enter a place, building or vessel in their township, for the purpose of examining into and destroying, removing or preventing any nuisance, source of of filth,or cause of sickness, and shall be refused such entry, any member of the Board may make complaint, under oath, to any justice of the peace of his county, whether such justice be a member of the Board or not, stating the facts of the case, so far as he has knowledge thereof. Such justice shall thereupon issue a warrant, directed to the sheriff or any constable of the county, commanding him to take sufficient aid, and being accompanied by two or more members of said Board of Health, between the hours of sunrise and sunset, repair to the place where such nuisance, source of filth or cause of sickness complained of may be, and the same destroy, remove or prevent, under the direction of such members of the Board of Health.

Section 23, *ibid.*, provides that local boards shall provide "nurses, attendants, and other necessaries for the care of the sick."

In *State v. Plymouth County*, 62 Iowa, 269, the Supreme Court says this statute authorizes and requires the local Board of Health to make "effectual provision in the manner in which they shall judge best for the safety of the inhabitants."

This statute is both mandatory and directory. The local board must act forthwith, and do whatever is necessary in the premises. They are not presumed to know whether or not the quarantined persons or the sick are able to pay the expenses of such quarantine. The statute does not contemplate any inquiry in that direction. The local board is called in an emergency to act in a summary manner for the protection of the public.

By what authority can a board of supervisors interfere with regulations made, and acts done under an express statute, and dismiss a physician employed by such local board and substitute a county physician on the ground that the sick are the county poor, thereby assuming a contingency that may or may not happen at all? The county may or may not be liable for the expenses of the quarantine. That is a question for future determination.

It is a fair presumption of this statute that the sick may employ any physician they please to attend them when under quarantine, regardless of the compensation for such service. There is nothing in the statute to the contrary.

Sub-division eleven, of section 302, of Miller's Code provides that county supervisors shall have the "care and management of the business of the county, not otherwise provided by law."

Sub-division twenty provides that they shall have and exercise all the powers in relation to the poor given by law to county authorities.

Said chapter one hundred and fifty-one, provides expressly the manner, and by whom the quarantine of contagious diseases shall be established and maintained, and being a later statute supersedes the Code of 1873.

It is a fair presumption that the term "poor," as used in said subdivision twenty refers to persons under the immediate care and support of the county, or those commonly denominated as "paupers."

There is nothing in the said chapter one hundred and fifty-one authorizing a board of supervisors to assume that because persons have been quarantined for a contagious disease that they are necessarily paupers, or poor persons within the care of the county, or that the county will necessarily have to pay the expense of such quarantine.

Section 14 of said chapter one hundred and fifty-one, provides that local boards shall "regulate all fees and charges of persons employed by them in the execution of the health laws and their regulations."

By what authority can a board of supervisors set aside and cancel an agreement or regulation made by a local board with a physician, nurses, attendants, etc., in pursuance of an express statute?

A notice directed to a board of township trustees is not a notice to a local board of health. The two boards are created under different statutes with entirely separate and distinct powers and duties, as though composed of different individuals, the statute having unified the membership for convenience and utility. This doctrine is clearly established in *Sanderson v. Cerro Gordo County*, 80 Iowa, 89.

J. F. KENNEDY,
Secretary.

IOWA CITY, Iowa, September 13, 1895.

Dr. J. F. Kennedy, Secretary State Board of Health, Des Moines, Iowa:

DEAR SIR—Your favor of September 9th at hand. You set out a copy of your answer to the question whether the county board of supervisors can dismiss a physician appointed by the local board of health in a case where quarantine has been established and direct the county physician to take charge; also, where the board refuses to pay expenses of quarantine including the pay of a physician appointed by the board of health.

I would say that I think the answer given is correct, and see no special reason why any change should be made. Yours truly,

MILTON REMLEY,
Attorney-General.

JANUARY MEETING, 1897.

The Board convened January 27th. All the members were present.

The quarterly report of the Secretary was submitted and referred.

CONTAGIOUS DISEASES IN SCHOOLS.

Dr. Shrader moved that the Regulations for the Restriction and Prevention of Contagious Diseases in Public and Private

Schools, reported by the Committee on Publication, be approved and declared official. The motion was adopted.

The regulations are as follows:

THE STATE OF IOWA—HEALTH DEPARTMENT.

OFFICE OF THE STATE BOARD OF HEALTH,
DES MOINES.

At a meeting of the Iowa State Board of Health, held November 6, 1896, the following rules, as revised by the Committee on Publications and Papers, were adopted for the restriction and prevention of contagious diseases in the public and private schools of this State, pursuant to authority vested by chapter 151, laws of 1880, section 2, and the same are binding upon school boards, teachers and all persons throughout the State.

By order of the Board.

E. H. CARTER, M. D.,
President.

J. F. KENNEDY, M. D.,
Secretary.

RULES AND REGULATIONS.

RULE 1. Every person entering any public or private school of Iowa must give satisfactory evidence of protection by vaccination.

RULE 2. The fact of vaccination and protection must be entered with each name on the school record and on transfer and promotion lists.

RULE 3. Persons afflicted with diphtheria (membraneous croup), measles, rotheln, scarlet fever (scarlatina, scarlet rash), whooping cough or small-pox must be excluded from school until upon a certificate from the attending physician or health officer, showing complete recovery through disinfection of his or her person and clothing and the disinfection of the home. the mayor or township clerk, as the case may be, issues a written permit for their readmission. All other persons from families where such diseases exist shall also be excluded from the schools until they are furnished with a permit as above required.

RULE 4. Every school teacher and school officer who discovers, or who has knowledge of a case of these contagious diseases, must immediately report the fact to the mayor or township clerk, as the case may be; also to the superintendent or principal of the school and to the parents of the children, and must send the pupil or teacher thus afflicted to their homes at once. Teachers must not visit premises wherein are children sick with any contagious disease, and must carefully avoid exposure to such diseases.

RULE 5. If a person is ascertained to have attended school when affected with either of these contagious diseases, the local board of health shall immediately close the room wherein such person attended and direct its proper disinfection.

TO SCHOOL OFFICERS AND LOCAL HEALTH BOARDS.

(*a*) It is best not to close the school except as above directed, for disinfection of the room or rooms. The children are more apt to meet and to visit each other socially and thus become exposed.

(*b*) In case of an outbreak of small-pox in any community, or a threatened outbreak, every child attending the schools and every *teacher* must be examined relative to having been successfully vaccinated, and if not vaccinated, must be excluded from the schools until so protected.

(c) In all cases of doubt the public must have the benefit of the doubt. It is infinitely better to isolate and quarantine a suspicious case for a few days and find a harmless mistake had occurred, than to allow such an one to attend the school, and, after many had been wantonly exposed, find that a fearful and fatal mistake had been made. Prevention is inexpensive and sensible—exposure is always dangerous, and hence senseless.

EARLY SYMPTOMS OF CONTAGIOUS DISEASES.

SMALL-POX—This disease, though highly contagious, is comparatively rare, owing to the fact that vaccination is a safe preventive. Its early symptoms are so nearly similar to those of some other diseases that only an experienced physician can properly diagnose it. Vaccination and re-vaccination are better in this disease than rules for diagnosis or for restriction.

SCARLET FEVER—This disease is also called *scarlatina* and *scarlet rash*—both of which names are misleading, inasmuch as they are often used to express some harmless form of eruption. They are both accommodating terms for, and are identical with, scarlet fever. The disease is often sudden in its attack. There is nausea, vomiting; hot, dry skin; full, rapid pulse; high temperature, headache, flushed face; whitish coated tongue, with little red projections through the coating; very fine rash in the roof of the mouth, sore throat and pain in swallowing. Rash usually appears within the first twenty-four hours, first about the neck and face, and thence extends over the entire body. It is light red, uniform smooth, and is followed by a white line, or mark, if the finger is passed over it. These symptoms may not all be present, nor in the order named. The *characteristic* symptoms are: *Vomiting, high fever setting in early, sore throat, whitish furred tongue, and appearance of fine rash within twenty-four hours.*

MEASLES—The onset of this disease is similar to what is commonly called "a cold in the head." Eyes watery and red, watery discharge from the nose, fever, hoarse, dry, husky and painful cough: and eruption in the roof of the mouth, with or without sore throat. The eruption does not appear before the second or third day—first in the forehead and face—is in patches and of a dull red color, and the skin has a roughened feel to the touch. The earliest initial symptoms are: *Watery eyes, sensitive to the light; discharge from the nostrils, sneezing; rough, dry cough, with pain under the breast bone; the late appearance of the eruption, its occurring in patches, with interspersed spaces of healthy skin and the roughened feel, and swollen appearance of the skin.*

ROTHELN, OR GERMAN MEASLES—This disease, in its early symptoms, occupies an intermediate place between scarlet fever and measles without possessing the dangers of either. Hence it is better to mistake it for scarlet fever or measles and treat it as such than to mistake either measles or scarlet fever for rotheln and treat them as such It is highly contagious, and children so affected must be sent home and only allowed to re-enter the school on a certificate as required in Rule 3. It should be treated by isolation and disinfection. The common symptoms are sore throat, watery eyes and nostrils, slight fever, an eruption appearing early on the neck and upper part of chest, rapidly spreading over the body, and soon subsiding.

There is very little constitutional disturbance. Its characteristic symptoms are: *Moderate amount of fever, early appearance of a fine rash resembling the so-called "scarlet rash," with early disappearance of same, and more or less swelling of the glands of the neck.*

DIPHTHERIA—This disease is especially characterized by precursory symptoms. There is more or less languor, impaired appetite, slight fever and restlessness for some days before the throat symptoms manifest themselves, and if diphtheria is prevalent in a community, a child manifesting such symptoms should receive prompt attention, and should excite serious apprehension. In addition to these premonitory symptoms the pulse is rapid and rather feeble, the throat and soft palate are red and moderately swollen; there is pain on swallowing fluids rather more than solids; putrid breath, and the appearance upon the tonsils of whitish or ash-colored spots, which rapidly coalesce and form a thick, leathery, ash-colored membrane. If the air passages become involved there is a croupous cough and breathing. The characteristic symptoms of diphtheria are: *Languor and debility; redness, soreness and swelling of the throat; fetid breath; ash-colored spots running together; rapid, feeble pulse, and croupous symptoms if there is extension of the membrane into the air passage.*

MEMBRANOUS CROUP so closely resembles diphtheria when the latter invades the air passages that the Board has included it in the rules and regulations for the restriction and prevention of diphtheria.

WHOOPING COUGH—Whooping cough is an infectious disease. A pupil affected with it must be excluded from the schools until entire recovery. There is no necessity for quarantining the adult members of the family or the premises, except to exclude the children from the schools and from public gatherings.

TYPHOID FEVER—This disease closely resembles diphtheria in the initial symptoms There is languor, a tired feeling lasting many days, headache; wakefulness, frequent diarrhœa, tongue red, especially at tip and edges, and tendency to bleeding at the nose, with fever, which gradually increases towards evening. There are no throat symptoms.

Typhoid fever is deemed to be the result of a special contagium, present in the excreta of typhoid fever patients. The disease germ is multiplied after being thrown from the bowels, and finds its way into the intestinal track through water or food. The patient should be isolated from the well, and all discharges be thoroughly disinfected and buried The premises need not be quarantined.

Upon the outbreak of diphtheria or typhoid fever, the teacher, especially in country districts where the local board of health is too often ignorant or neglectful of their duty, should suggest, and so far as possible, insist upon a careful inquiry into the source and healthfulness of the water supply. In nearly all such cases the drinking water is found contaminated, and its early discovery may prevent many other cases occurring.

ISOLATION—Isolation means the complete exclusion of all other persons from the sick except the nurse and attending physician; that the nurse shall be restrained from going to and from the premises, or mingling with the family, that all well persons shall be prevented from contact with bedding, clothing, food, or other articles that have been used on or about the sick. Where from necessity the parents or family are nurses, the isolation and quarantine applies to them.

ORDER FOR VACCINATION—At a meeting of the State Board of Health, February 2, 1894, for the purpose of preserving and improving the public health, and of preventing the spread of the disease known as small-pox, the following rules and regulations were ordered:

First.—All persons in this State over the age of one year, who have not been vaccinated, or who, in the opinion of the local board of health of the district or jurisdiction in which such persons reside or are found, do not furnish satisfactory evidence of protection from small-pox, are hereby ordered to be vaccinated.

Second.—Local boards of health and all officers who compose said boards, and all sheriffs, constables, city marshals, and police officers within their respective jurisdictions, are hereby directed to enforce the foregoing order as soon as practicable, and so far as said order shall apply to the pupils of any public or private school or to the teachers thereof. The officers of the school district in which such school is held shall also require its enforcement.

BILL RELATING TO THE STATE BOARD OF HEALTH.

On motion the Board proceeded to a consideration of the report of the Code Commissioners, relating to the State Board of Health—Chapter 16, Title XII.

The following important change was unanimously recommended, relative to vital statistics:

For sections 3 and 4, as recommended by the Commissioners, the Board recommended the following as substitutes:

"SEC. 3. It shall be the duty of all assessors to obtain and report to the county auditor, upon blanks adopted by the State Board of Health, and furnished by said auditor, such registration of births and deaths as occur within their respective districts for the year ending December 31st, immediately preceding.

"SEC. 4. The clerk of the court in each county shall keep a book in which shall be recorded all marriages occurring within the county, together with such data respecting the same as shall be required by the State Board of Health, and he shall report to the Secretary of the State Board of Health on or before the 1st day of June in each year such data respecting such marriages for the year ending December 31st, immediately preceding.

"The auditor of each county shall keep a book in which shall be recorded all births and deaths occurring within the county as shown by the returns filed in his office by the assessor, as provided in section three, and on or before the 1st day of June in each year shall furnish to the Secretary of the State Board of Health a report of such births and deaths."

DISINTERMENT OF CORPSES.

The committee to whom was referred a form for the disinterment of corpses in certain cases, submitted the following and recommended its adoption, and it was adopted:

STATE OF IOWA—HEALTH DEPARTMENT.

SPECIAL DISINTERMENT PERMIT.

Application having been made for the disinterment of the dead body of .... now lying buried in ....cemetery, in the

......................of.............county of.............State of Iowa,
(City, town, or township)
who died on the......day of..........18... aged....years....months......
days, the cause of death being.................................... which is contagious as shown by the certificate of death of said deceased, given by .... attending physician, this is to certify that permission is hereby given for such disinterment and removal to.................... cemetery in the..........of..........county of.........State of Iowa, upon the following conditions, to-wit:

First.—That the disinterment is for the purpose of re-interment in another part of the same cemetery, or in a cemetery nearly contiguous.

Second.—That the removal shall not be by any public conveyance.

Third.—That the removal shall be done at an hour when there is the least possible exposure of other persons.

Fourth.—That no children shall be present, and only such persons as are actually necessary.

Fifth.—That the coffin shall not be opened.

Sixth.—That the sexton and all other persons engaged in such removal shall immediately thereafter change their clothing and properly disinfect or burn the same, and shall thoroughly disinfect their hands, head and face.

Seventh.—That this permit shall be approved by the local board of health of the......................of...........county of..........State of Iowa.
(City, town, or township)

It is understood and provided that nothing herein shall be deemed as contravening or in anywise modifying or releasing the regulations of the State Board of Health governing the disinterment of corpses.

By order of the State Board of Health, at Des Moines, the..........day of..........189..

....
President.

....
Secretary.

The foregoing application for disinterment and removal is hereby approved by the local board of health of the............of............State of Iowa, this........day of...........18...

....
President Local Board of Health.

(If a city or town affix corporate seal)

Attest: ....
Clerk Local Board of Health.

REPORTS OF INFECTIOUS DISEASES.

Dr. Gibson presented the following resolution, which was adopted:

Whereas, It is the duty of the clerk of the local board of health to report promptly to the Secretary of the State Board of Health any and every outbreak of contagious disease, and it is apparent to the members of the State Board of Health that this duty is not performed in the greater number of cases, be it

Resolved, By the State Board of Health, now in session, that this Board will expect a proper notification from all local boards of health, of any and every outbreak of contagious disease, in order that this Board may keep in touch with the local boards, and thereby be enabled to assist them in controlling and stamping out contagious diseases which are constantly destroying the lives of our people and bringing deep sorrow into many otherwise happy homes throughout our beloved State.

SHIPMENT OF DISINTERRED CORPSES.

In accordance with the instructions of the Board at the November meeting, the following question was submitted to the Attorney-General:

OFFICE OF THE STATE BOARD OF HEALTH,
November 12, 1896.

Hon. Milton Remley, Attorney-General:

Your attention is respectfully directed to the following regulations of the State Board of Health. Forms 98B and 104B, regarding the disinterment and shipment of corpses by railroad:

[Form 98B.]

TO WHOM IT MAY CONCERN.

In accordance with the Rules and Regulations adopted by the National Association of Railroad General Baggage Agents, and the Iowa State Board of Health, whenever it is desired to disinter the dead body of a human being, for removal or transportation, application for permission so to do must be made to the State Board of Health for each body to be disinterred.

The application must state the full name of the deceased, also the age, cause of death, date of death, name of physician who made certificate of death, place of burial and where to be re-interred.

No disinterred body will be received for transportation by any railroad unless accompanied by a Special Disinterment Permit from the State Board of Health, which is additional to the regular Transportation Permit.

The Disinterment Permit must also be approved by the Local Board of Health of the jurisdiction where the body lies buried.

Depositing bodies in a Receiving Vault is deemed a burial, and a Disinterment Permit will be required for removal of a body therefrom.

A body dead from diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), small-pox, Asiatic cholera, leprosy or typhus fever must not be deposited in a receiving vault.

A receiving vault in which is deposited a body dead from Asiatic cholera, small-pox, diphtheria (membranous croup), leprosy, scarlet fever (scarlatina, scarlet rash), typhus fever, must not be opened for the removal of such body, nor for the deposit of bodies dead from non-contagious diseases, nor for the entrance of living persons, and no permit will be granted for the removal of bodies from such vault.

Where the disinterment is for the removal of bodies to another part of the same cemetery, or to a contiguous cemetery, the removal must not be by any public conveyance. In such cases, it is not required that the bodies shall be prepared as for transportation by railroad or other public conveyance. But a disinterment permit from the State Board, approved by the local board, must be obtained for each body to be disinterred.

Children must not be permitted to be present at disinterments.

No permit will be granted for the disinterment of bodies dead from small-pox, Asiatic cholera, typhus fever, diphtheria or scarlet fever (scarlatina, scarlet rash), and for sanitary purposes, membranous croup will be deemed to be diphtheria.

The penalty for the digging up, disinterring, removing or carrying away any human body without lawful authority, is imprisonment in the penitentiary not exceeding two years, or a fine not exceeding twenty-five hundred dollars. [Code, section 4017.]

Blank forms of Application for Permits will be furnished on request to this office for Form 24E

Undertakers and others will save possible delay and trouble in the removal of corpses, by strictly conforming to these instructions.

These regulations apply equally to all express companies.

THE STATE OF IOWA—HEALTH DEPARTMENT.

[Form 104.]

IOWA STATE BOARD OF HEALTH,
SECRETARY'S OFFICE, DES MOINES.

To all Railroad Companies, General Baggage Agents, Train Men, Station Agents, Express Companies, and Undertakers:

Complaint is made by several railroad general baggage agents who are endeavoring strictly to enforce the regulations of the State Board of Health and of the National General Baggage Association regarding the transportation of corpses, that bodies are delivered from connecting roads, when the transportation permit accompanying the body states the cause of death was diphtheria or membranous croup. Transportation or disinterment of persons dead from diphtheria, small-pox, asiatic cholera, leprosy. typhus fever, and yellow fever, scarlet fever, scarlatina, and scarlet rash, is positively prohibited within this State under any conditions, for the protection not only of the public, but of railroad companies and train men, and for all sanitary purposes, membranous croup is to be deemed and treated as diphtheria. However carefully bodies may be prepared for shipment, it affords no protection against danger by collision and crushing of cars and their contents.

As a matter, therefore, of protection, justice, economy, and obedience to law, it is imperative that these regulations be rigidly observed on all railroads operated in this State.

It has come to the knowledge of the State Board that physicians, through ignorance or design, in many instances give the cause of death as "*Heart Failure, Nervous Prostration*," *etc.*, which are sequelæ of diphtheria, when the real cause was diphtheria.

Railroad train men, station agents, and express agents would therefore be fully justified in deeming as suspicious, if not in absolutely rejecting a corpse accompanied with a permit in which the cause of death is given as "Heart Failure" where the age of deceased is under thirty years, unless there is positive statement in the physician's certificate that the "Heart Failure" was not the result of diphtheria or membranous croup. The State Board of Health has ordered that a physician's certificate giving "Heart Failure" as a cause of death, must not be accepted by a county clerk for record, and must be returned to the physician who made it for proper specification. It is known that serious results, and the loss of many lives, have followed the shipment of a corpse under false return of the cause of death.

Every transportation permit where the cause of death was a contagious disease, other than those named above or any complication thereof, must in addition to approval by the local board of health, *be approved and countersigned by the health officer of such local board* as a protection against improper shipment.

In accordance with the rules and regulations adopted by the National Association of Railroad General Baggage Agents, and the Iowa State Board of Health, whenever it is desired to disinter the dead body of a human being, for removal or transportation, application for permission so to do, must be made to the State Board of Health, blanks for which will be furnished by the Secretary.

No disinterred body must be received for transportation by any railroad, express company, or other public conveyance, unless accompanied by a special disinterment permit from the State Board of Health for each body, which is additional to the regular transportation permit, and the date of death of decedent as given in the physician's or coroner's certificate, must be taken as evidence of burial and disinterment.

The disinterment permit must also be approved by the local board of health of the jurisdiction where the body was disinterred.

The penalty for the digging up, disinterring, removing or carrying away any human body without lawful authority, is imprisonment in the penitentiary not exceeding two years, or a fine not exceeding twenty-five hundred dollars. [Code, section 4017.]

Depositing bodies in a receiving vault is deemed a burial, and a disinterment permit is required for removal therefrom.

J. F. KENNEDY, M. D.,
Secretary.

E. H. CARTER, M. D.,
President.

The object and purpose of the special disinterment permit is to prevent the possible transportation of a dead body from an infectious disease, and thus endangering the lives and health of the public. The regulations regarding disinterment apply to all bodies, regardless of the cause of death

Suppose it is desired to ship a disinterred body dead from a disease the transportation of which is not prohibited, from a point in Illinois through Iowa to a point in the State of Nebraska In such a case would it be necessary to obtain a special disinterment permit from the Iowa State Board of Health in order to transport such body through this State, it being understood that in all other regards the regulations of the States of Illinois and Nebraska regarding transportation of corpses have been fully complied with, and it being further understood that the States of Illinois and Nebraska have no regulations respecting the disinterment of bodies?

J. F. KENNEDY, M. D.,
Secretary.

DES MOINES, Iowa, September 17, 1896.

Dr. J. F. Kennedy, Secretary State Board of Health, Des Moines, Iowa:

DEAR SIR—Yours of September 2d came duly to hand, in which you enclose the rules and regulations of the State Board of Health, Form 98B and 104B, and ask:

"Suppose it is desired to transport a disinterred body, dead from a disease the transportation of which is not prohibited, from a point in Illinois through the State of Iowa to a point in Nebraska. In such a case, would it be necessary to obtain a special disinterment permit from the Iowa State Board of Health in order to transport the body through this State, it being understood that in all other regards the regulations of the States of Illinois, Iowa and Nebraska, regarding the transportation of corpses have been fully complied with, and it being further understood that the States of Illinois and Nebraska have no requirements respecting the disinterment of bodies?"

I am at a little loss to understand the exact point upon which my opinion is desired.

If the inquiry is in regard to the necessity for such rules and regulations being adopted. I beg to state that such question is not a question of law so much as what is, in the judgment of the Board of Health, necessary for the protection of public health. I assume that the Board, in adopting such rules and regulations, adopted none but those they thought to be necessary.

I assume, however, that the thought of the question is whether the Iowa State Board of Health has authority to adopt rules and regulations for the transportation of bodies disinterred in the State of Illinois, transported through the State of Iowa to the State of Nebraska, it being conceded that death was not caused by an infectious disease. In regard to this, I do not think that the fact that the body is received from another State and passes through the State, makes any difference in the authority of the Board to regulate the transportation. It is undoubtedly one of the police powers of the State which has never been surrendered to the Federal Government to protect the public health. Under the Interstate Commerce clause of the Constitution, there has been no successful attempt to defeat the police laws of the State looking toward the public health and safety.

A refusal to permit the transportation of a body that has been disinterred could hardly be considered an interference with Interstate Commerce. If, in the judgment of the State Board of Health, which under our statute has full power to make rules and regulations respecting such matters, it is dangerous to public health to permit a disinterred body to be transported along the lines of railroad in the State or through the State, it, in my judgment, has authority to make such regulations.

The question whether the transportation of such a body is actually dangerous to public health is one for the good judgment of the Board to determine. The fact that Nebraska and the State of Illinois have made no regulations in regard to the transportation of such bodies, does not prevent the Iowa State Board of Health making any regulation that it may deem necessary.

Hence, my answer to the question, as I understand it, would be that under the rules and regulations which you submit to me, they having been adopted in the exercise of the lawful powers of the Board, it would be necessary, in order to lawfully transport a body disinterred in another State across the State of Iowa, to comply with the requirements and regulations of the Board by procuring a special permit.

Yours respectfully,

MILTON REMLEY,
Attorney-General

MIDWIVES.

The following correspondence respecting the authority of the Board to regulate the practice of midwifery, was presented:

IOWA STATE BOARD OF HEALTH,
OFFICE OF THE SECRETARY,
DES MOINES, November 12, 1896.

Hon. Milton Remley, Attorney-General:

Section one, chapter one hundred and four, acts of the Twenty-first General Assembly, provides:

"SECTION 1. That every person practicing medicine, surgery or obstetrics, in any of their departments within this State, shall possess the qualifications required by this act. If a graduate in medicine, such person shall present his or her diploma to the State Board of Examiners for verification as to its genuineness. If the diploma is found genuine, and issued by a medical school legally organized and of good standing, of which the State Board of Examiners shall determine, and if the person presenting and claiming such diploma be the person to whom the same was originally granted, then the State Board of Examiners shall issue its certificates to that effect, signed by not less than five physicians thereof, representing one or more physicians of the schools on the Board, and such certificate shall be conclusive as to the right of the lawful holder to practice medicine, surgery and obstetrics within this State. If not a graduate, the person practicing medicine or surgery within this State, unless he or she shall have been in continuous practice in this State for a period of not less than five years, of which he or she shall present to the State Board of Examiners satisfactory evidence in the form of affidavits, shall appear before said State Board of Examiners and submit to such examination as said Board may require. All examinations shall be conducted in writing, and all examination papers, together with the reports and action of the examiners thereon, shall be preserved as the records of said board for a period of five years, during which time they shall remain open for inspection at the office of said State Board of Examiners. Such examinations shall be in anatomy, physiology, general chemistry, pathology, therapeutics and the principles and practice of medicine, surgery and obstetrics. *Provided*, that each applicant upon receiving from the Secretary of the Board an order for an examination, shall receive also a confidential number, which he or she shall place upon his or her examination papers, so that when said papers are passed upon by the examiners the latter shall not know by what applicant said papers have been prepared. That upon each day of examination all candidates be given the same set or sets of questions. It is further provided that the examination papers shall be marked upon the scale of one hundred (100), and that in order to secure a license it shall be necessary for the applicant to attain such average as shall hereafter be determined by the State Board of Examiners, and if such examination be satisfactory to at least five physicians of said Board, representing the different schools of medicine on the Board, the Board shall issue a certificate which shall entitle the lawful holder thereof to all the rights and privileges herein provided, and the physicians and the Secretary of the State Board of Health shall constitute and be deemed a board of examiners for the purpose of this act."

Section four provides:

"SEC. 4. Every person holding a certificate issued by the State Board of Examiners, shall, within sixty days after the date of such certificate, have the same recorded in the office of the county recorder in the county wherein he resides, and should he remove from one county to another to practice medicine, surgery or obstetrics, his certificate must be recorded in the county to which he removes. The county recorder shall endorse upon the certificate the date of record, and he shall be entitled to charge and receive a fee of fifty cents for his services, the fee to be paid by the applicant."

Sections eight and nine provide:

"SEC. 8. Any person shall be deemed as practicing medicine, surgery or obstetrics, or to be a physician within the meaning of this act, who shall publicly profess to be a physician, surgeon or obstetrician, and assume the duties, who shall make a practice of prescribing or of prescribing and furnishing medicines for the sick, or who shall publicly profess to cure or heal, by any means whatsoever, but nothing in this act shall be construed to prohibit students of medicine, surgery or obstetrics from prescribing under the supervision of preceptors, or gratuitous service in case of emergency, nor shall this act extend to prohibit women who are at this time engaged in the practice of midwifery, nor to prevent the advertising, selling or prescribing natural mineral waters flowing from wells or springs, nor shall this act apply to surgeons of the United States army or navy, marine hospital service, nor to physicians as defined herein who have been in practice in this State for five consecutive years, three years of which time shall have been in one locality; provided, such physician shall furnish the State Board of Examiners satisfactory evidence of such practice, and shall procure the proper certificate, as provided in this act, and for which certificate such physician shall pay the Secretary of the State Board of Examiners a fee of two dollars, and said board shall issue to the applicant such certificate, nor shall this apply to registered pharmacists when filling prescriptions, nor shall it be construed to interfere with the sale of patent or proprietary medicines in the regular course of trade "

"SEC. 9. Any person who shall practice medicine or surgery within this State without having complied with the provisions of this act, and who is not embraced in any of the exceptions, or after being prohibited from so doing as provided in section seven of this act, shall be deemed guilty of a misdemeanor, and shall, on conviction thereof, be punished by a fine of not less than fifty nor more than one hundred dollars, or by imprisonment in the county jail not less than ten days nor more than thirty days."

Under the provisions of section one *all persons* practicing medicine, surgery, or obstetrics in this State are required to have the qualifications provided in this chapter, to-wit: a diploma from a medical school, or a successful examination before the State Board of Medical Examiners. The exceptions to this rule are set forth in section eight, among which are physicians who have practiced five years in the State prior to the passage of the act, and midwives in practice at the time of the passage of the act. (April 9, 1886.)

The evident object and intent of this statute is to protect the people against incompetency of those who profess to practice medicine, surgery, or obstetrics. The only reference to midwives is in section eight. It is a fact that a very large proportion of obstetrical practice in this State is performed by midwives, and that they often assume and usurp the functions of physicians; and too often without any qualifications at all.

Not only is this practice an encroachment upon the rights and practice of those who have fully conformed to the requirements of the statute, and a violation of the evident purpose of the statute, but it is a constant menace to the public health. In many counties of the State, the records show that a majority of the births are attended by midwives.

The question arises whether or not midwives in practice subsequent to the passage of the act, are, under its provisions required to procure a certificate from the State Board of Medical Examiners, or are under any restrictions whatsoever. Also, whether there is any provision in said chapter for the practice of midwifery except by duly authorized physicians, and by the women designated in the exceptions specified in section eight.

Section two, chapter one hundred and fifty-one, Acts of the Eighteenth General Assembly provides:

"SEC. 2. The State Board of Health shall have the general supervision of the interests of the health and life of the citizens of the State. They shall have charge of all matters pertaining to quarantine; they shall supervise a State registration of marriages, births and deaths, as hereinafter provided; they shall have authority to make such rules and regulations and such sanitary investigations as they may from time to time deem necessary for the preservation or improvement of the public health; and it shall be the duty of all police officers, sheriffs, constables and all other officers of the State, to enforce such rules and regulations, so far as the efficiency and success of the Board may depend upon their official coöperation."

Section five provides:

"SEC. 5. It shall be the duty of all physicians and midwives in this State to register their names and postoffice address with the clerk of the district and circuit courts of the county where they reside; and said physicians and midwives shall be required, under penalty of ten dollars ($10), to be recovered in any court of competent jurisdiction in the State, at suit of the clerk of the court, to report to the clerk of the courts, within thirty (30) days from the date of their occurrence, all births and deaths which may come under their supervision, with a certificate of the cause of death, and such other facts as the Board may require, in the blank forms furnished, as hereinafter provided."

It is a question with the State Board of Health whether or not under the provisions of said chapter one hundred and fifty-one the Board has authority to make rules and regulations defining the duties of midwives, not only to the public, but when attending the prospective mother and her offspring at the most critical period of their lives.

The Illinois State Board of Health has prepared under a statute almost identical with chapter one hundred and fifty-one, such regulations.

Your opinion is respectfully requested as to whether or not said regulations are in contravention of the powers and duties of the Iowa State Board of Health, to make regulations for the preservation or improvement of the public health, as prescribed in said chapter one hundred and fifty-one, or in chapter sixteen, title XII, of the Code Revision, page five hundred and seventeen, which is identical with chapter one hundred and fifty-one, and which has been agreed upon in both houses of the Legislature.

J. F. KENNEDY, M. D.,
Secretary.

STATE OF IOWA,
OFFICE OF ATTORNEY-GENERAL,
DES MOINES, January 25, 1897.

Dr. J. F. Kennedy, Secretary State Board of Health, Des Moines, Iowa:

DEAR SIR—Your favor of recent date at hand, enclosing me a copy of the rules and regulations adopted by the State Board of Health of Illinois, which you say is organized and operating under a statute almost identical with chapter one hundred and fifty-one of the Eighteenth General Assembly of Iowa. You ask my opinion as to whether or not the Iowa State Board of Health has power, under our law, to make rules similar to those adopted by the Illinois Board of Health.

I have not examined the act under which the Illinois State Board of Health is acting, and do not undertake to pass upon the question, not even by inference, as to whether or not the Illinois State Board of Health has exceeded its authority in adopting such rules. The rules submitted to me, however, appear to be of comprehensive direction to midwives as to the manner of performing their duties, covering nearly every conceivable case, the last rule being this: "Midwives must conscientiously guard the secrets of their patients, and must only divulge them if the law requires them to do so."

In reply to your inquiry, I beg to state that I know of no statute of the State of Iowa which gives to the Board of Health authority to make such rules and regulations. You call my attention to the following clause of section two of the act under which the Board was organized: "They (the Board) shall have power to make such rules and regulations and such sanitary investigations as they may, from time to time, deem necessary for the preservation or improvement of public health." If the Board of Health has authority to enact such rules, it is not under this clause of the law.

If I were to concede that this clause of section two gave the State Board of Health power to legislate and make laws and regulate all matters affecting public health, yet in my judgment, under well settled principles, it would have no authority to legislate upon the subject proposed. By what is called the Medical Practice Act, or chapter one hundred and four of the Twenty-first General Assembly, the Legislature has enacted a law upon the subject of the practice of medicine, surgery and obstetrics. It must be conclusively presumed, in the absence of some statutory provision showing a contrary purpose, that the laws adopted by the Legislature upon that subject were all that it deemed necessary.

Excessive indulgence in intoxicating liquors affects the health. The Legislature has enacted a law regulating the sale. Because the Board might deem such laws insufficient for the purpose, I do not think they would be authorized to supplement the laws enacted by the Legislature by rules and regulations which they may adopt. Any subject upon which the law-making power has legislated, cannot be considered one upon which Boards created by the Legislature may legislate.

Suppose your Board thought the practice of certain schools of medicine was injurious to the public health; could it be claimed it had the right to prohibit physicians of such schools practicing? Suppose certain remedies and manner of treating diseases were by the majority of the Board thought to be injurious to the patient; would it be claimed that on that account this Board could prohibit such practices, and determine that none other than those methods recommended by the Board should be used? I cannot think that any such powers were intended to be given by the Legislature to this Board.

I do not think that the general terms used in section two, such as "The Board of Health shall have the general supervision of the interests of the health and life of the citizens of the State," and "They shall have authority to make such rules and regulations and such sanitary investigations as they may, from time to time, deem necessary for the preservation or improvement of public health," will justify the conclusion that the Board is given unlimited authority to legislate upon every subject that enters into the question of public health.

In regard to quarantine, they are given ample jurisdiction. In some matters referred to in said section, I think their duties are merely advisory and educational. They may gather statistics in regard to marriages, births and deaths; they may make sanitary investigations. I will not at this time undertake to say the extent to which the Board may go in making rules and regulations which shall have the force and effect of law. I am clear, however, that there is a limit to the power of the Board. Virtue, sobriety, plain food, regular habits of life of the individual are all conducive to health. Any rule or regulation which inaugurates or compels correct methods of living among the masses, would be a means of improving public health.

If, under the clause quoted, the State Board of Health may make every rule and regulation which they deem necessary for the improvement of public health, there is no end to the subjects on which they may make regulations, controlling even the manner of life of the individual. This appears to me is unwarranted by the Act of the Legislature, and would be usurpation of power. Yours respectfully,

MILTON REMLEY,
Attorney-General.

KEROSENE INSPECTION.

The following amendment to the regulations for the inspection of kerosene was adopted:

"No thermometer shall be used by inspectors for testing oil unless the same has been calibrated and tested for errors at the observatory at Yale College, and a certificate secured showing the result of the calibration. A copy of all such certificates shall be sent to the Secretary of the State Board of Health, and recorded in his office."

DISINFECTION.

The Committee on Infectious Diseases reported the following change in the regulations for disinfecting rooms in which had been persons sick with contagious diseases, especially relating to the removal of the paper from the wall. The amendment was adopted:

"If the disease was scarlet fever (scarlatina, scarlet rash) or small-pox the paper on the walls and ceiling, if any there be, shall be removed and completely burned. If the disease was diphtheria, typhoid fever or measles the paper on the walls shall be thoroughly dusted and brushed." Of course the disinfection by fumigation, ventilation and other means must be thoroughly practiced in all cases.

MAY MEETING, 1897.

The Board held its annual meeting May 5, 1897. There were present Drs. Carter, Conniff, Bancroft, Emmert, Scroggs, Shrader, Guilbert (the latter having been reappointed by the Governor); Dr. Gibson, State Veterinary Surgeon, and Warren Dickinson, civil engineer.

The Secretary presented his quarterly report, which was read and referred.

TRANSPORTATION OF CORPSES.

The following communication from the chairman of the Committee of the General Railroad Baggage Agents' Association was presented and referred to the Committee on Transportation of Corpses:

MICHIGAN CENTRAL RAILROAD COMPANY,
OFFICE OF GENERAL BAGGAGE AGENT, CHICAGO, April 21, 1897.

To Iowa State Board of Health:

GENTLEMEN—At the Richmond meeting of the American Association of General Baggage Agents, a committee consisting of W. H. Gummere, Lehigh Valley railroad; G. E. Byram, Fitchburg railroad; P. Walsh, Atchison, Topeka & Santa Fe; E. A. Sadd, Chicago, Burlington & Quincy railway, and H. P. Dearing, Michigan Central railroad, was appointed to confer with health authorities and funeral directors with a view of ascertaining if any changes or modifications of the rules for transporting dead bodies, was desirable, and if so, to try to agree upon a ground work of rules to be considered by the several associations of health officers, railways, and funeral directors at a later date.

What we have termed association "Rules for the Transportation of Dead Bodies," has, with certain modifications and additions, been embodied in and become the rules of a number of state boards of health, and while the railways should be credited with maintaining them in some localities in the absence of State or territorial action, in a majority of States I believe the matter is now substantially out of our hands. At the same time the railways are vitally interested in the matter, not only with the general public, but we have a special interest in protecting the lives of our employés, and again, in dealing with our patrons it is very desirable that the rules be uniform; particularly, when it is proposed to transport a body through several States or provinces, which occurs daily; and while it is conceded, I believe, that the rules of this association were an improvement on the methods that obtained previous to their adoption, the changes and modifications (which may be good) mentioned above, have caused a lack of uniformity, so desirable from our standpoint; and we wish to ascertain if it is possible to have uniformity of laws and rules for transporting the dead, and the question is asked: Has there not been sufficient progress in sanitary work, and in the practice of embalming as to warrant a modification of Rule 1, as applying in some localities? Is it not possible for skilled embalmers to prepare a body for shipment, even if dead of some of the diseases prohibited in Rule 1 so that it may be transported without any danger whatever?

Is it not possible to have such skilled embalmers examined by competent judges and licensed, and thus avoid placing the skilled and the ignorant workmen on the same level in this practice? If there is a demand for it, and interested parties are able and willing to pay for scientific work, and there are, on the other hand, those sufficiently skilled in the art of embalming to make the transportation of such a body safe, should not our rules be so framed as to permit it?

Our committee has been directed to confer with health authorities and funeral directors, and to report at a meeting to be held in Denver, October next, and I have been requested by the committee as their chairman to undertake to arrange a date for a joint conference, and we are particularly anxious to have the attendance of some representative health officers, so that if an agreement can be reached, we may reasonably hope for approval on the part of the several State boards and provincial boards of health.

I would ask, therefore, if you would attend such a meeting the middle or latter part of May, provided it is held at Cleveland or some central point; so far as the members of our committee are concerned, we would be glad to arrange to meet at any point most convenient to you. I wish each of you would invite any other health officers whose attendance you think desirable, and upon receipt of replies, I will name the date and place suggested by a majority.

An early reply is solicited. Yours truly,

H. P. DEARING,
Chairman G. B. A. Committee.

The committee submitted the following report, which was adopted:

Your committee on corpses, to which was referred the letter of Mr. H. P. Dearing, general baggage agent Michigan Central railway, of date April 21, 1897, attached herewith, respectfully submit the following report:

The committee believes it to be of the utmost importance that uniform rules and regulations for the transportation of corpses should be adopted, and that this Board should make an honest effort to secure the adoption of such rules.

We believe such can be done in this direction by presenting the matter at the conference of State Boards of Health to be held at Nashville, Tenn., August 18th and 19th, and would suggest to Mr. Dearing that his committee be present at that meeting, and in case this meeting can be arranged, that our representatives be instructed to make every effort to secure a uniform system of rules as proposed.

(Signed.)
J. A. Scroggs,
J. C. Shrader,
W. Bancroft.

REGULATIONS FOR QUARANTINE OF CONTAGIOUS DISEASES.

The Secretary submitted the following revised regulations for quarantine of contagious diseases, Form 130B, which were referred to the standing committee:

[Form 130B.]

RULES AND REGULATIONS FOR THE PROTECTION OF PUBLIC HEALTH AND FOR THE RESTRICTION AND PREVENTION OF CONTAGIOUS DISEASES.

QUARANTINE.

1. It shall be the duty of every physician practicing within the limits of any city, town or township to give written notice to the mayor, or township clerk, as the case may be, of any case of Asiatic cholera, small-pox, diphtheria (membraneous croup), scarlet fever (scarlet rash, scarlatina), typhus fever, measles or other disease dangerous to the public health that he may be called to attend professionally, within twenty-four hours after he shall first visit and ascertain the character of any such disease herein named. In all cases where no physician is in attendance, it shall be the duty of any person having charge of, or being at the head of a family, or having the care and custody of any lodging rooms to give notice in like manner as required herein of physicians.

2. It is the duty of the mayor or township clerk (as the case may be), as provided by law, upon notice given by any practicing physician that small-pox, diphtheria, scarlet fever or any other contagious disease dangerous to the public health exists in any place, forthwith, without other authority, to establish quarantine in such cases, as may be required by regulations of the State Board of Health and said local boards, and to maintain and remove such quarantine in like manner.

3. Quarantine shall be deemed to be:

(a) The placing of a yellow cloth or card not less than eighteen inches square, having imprinted thereon the name of the disease in large letters, upon such conspicuous place on each building, hall, lodging room, or place wherein exists a contagious disease, as will best protect the public health;

(b) Separation of the sick from all other persons, if possible, and from all persons except the members of the family, the attending physician, and nurses;

(c) The complete exclusion of all persons from the premises;

(d) That no person shall leave said premises except the attending physician, without a permit therefor signed by the mayor (or clerk) and countersigned by the health officer;

(e) That no article that has been used on or about a person sick with a contagious or infectious disease shall be removed from the sick room, nor from the premises, until the same has been properly disinfected;

(f) That when nurses are employed to care for the sick they shall not be permitted to leave the premises during such employment, and where neighbors, relatives or friends serve as nurses, they shall not be permitted to leave the premises without previous change of clothing, proper disinfection, and a permit from the mayor (or clerk, as the case may be).

4. Quarantine shall be established and maintained in each and every case for the period named herein, to-wit:

Scarlet Fever.—(Scarlatina, scarlet rash) forty days from date of the rash, desquamation having completely ceased, and there being no appearance of sore throat.

Diphtheria.—(Membraneous croup) thirty-five days.

Measles.—Twenty-one days, or until cough and desquamation have ceased.

Small-Pox.—Forty days.

Asiatic Cholera.—Twenty-one days.

Typhus Fever.—Until complete recovery and twenty-one days thereafter.

5. When a family is quarantined for diphtheria or measles, the head of the family or bread-winner, shall have the privilege of attending to his regular business, and of going to and from his house only when complying with the following conditions:

First.—He shall change his clothing before going to and leaving his home to go to his place of business.

Second.—He shall wash his hands, face, head and beard with a 2½ per cent solution of carbolic acid, each time after leaving his home to go to his place of business.

Third.—While in the house he shall not act as nurse or live in the same room with the sick person.

Fourth.—He shall not attend any public meeting, or attend any place where persons are congregated.

Fifth.—This privilege shall not be granted to school teachers, or to any person whose business brings him in intimate contact with children.

Nurses who have been employed to care for persons sick with contagious disease, may be released from quarantine when their services are no longer required, upon the order of the mayor or township clerk, as the case may be. Before leaving the premises there must be thorough disinfection of their person and clothing.

6. Whenever there is complete recovery of persons who have been sick with a contagious disease, and there are no further exposures thereto, the quarantine may be released, although the period prescribed herein has not elapsed. *Provided*, that no release of quarantine shall be permitted until at least seventeen days after the recovery of the last case, and proper disinfection of person and premises is made as hereinafter provided.

7. No order for the release of quarantine shall be made by the mayor (or clerk) as the case may be, except upon a report from the attending physician stating the number of persons on the quarantine premises, sick with the infectious disease in question, their name, age, and when the disease first appeared in each case, when recovered, and the means, if any, used for disinfection. If the mayor, or clerk, shall find that the regulations of the local board and of the State Board of Health respecting quarantine and disinfection have been complied with, the quarantine shall be forthwith released. If quarantine regulations have been complied with, and proper

disinfection has not been done, the mayor (or clerk) shall order it done under the supervision of the health officer or some other competent person, and the quarantine shall be continued until it is done.

8. No person, whether an owner, occupant, lessee or agent, shall rent or lease, or permit the occupation by any person, of any house, room or place, in which there have been any of the contagious diseases named in these regulations, unless the same has been previously thoroughly disinfected, and such disinfection approved by the mayor (or township clerk) and health officer. And the danger signal shall be maintained upon the premises until such disinfection is made.

9. No person shall give, lend or sell, or offer for sale, any clothing or other articles liable to convey infection of any contagious disease unless the same have been disinfected and such disinfection approved by the health officer of the local board.

10. When Asiatic cholera, small-pox, diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), leprosy, yellow fever, typhus fever, measles, or any other contagious disease exists in any house or dwelling place of a dealer in or seller of milk, he shall discontinue and cease to give, or sell, or distribute milk to any person, or to creameries or butter factories, or in anywise handle such milk, until a permit is granted therefor by the mayor (or clerk), countersigned by the health officer.

11. Isolation means the complete exclusion of all other persons from the sick except the nurse and attending physician; that the nurse shall be restrained from going to and from the premises or mingling wfth the family; that all well persons shall be prevented from contact with bedding, clothing, food, or other articles that have been used on or about the sick. Where from necessity the parents or family are nurses, the isolation and quarantine applies to them. The statute having provided that the expenses of quarantine of contagious diseases shall be paid by the county, it is best and safest to employ nurses to attend the sick, as the isolation can be more rigidly maintained and exposures prevented, instead of permitting the assistance of friends and neighbors.

CARE OF THE SICK.

12. A flannel cloth, wrung out of a strong solution of carbolic acid, should be hung constantly across the door leading into the room in which one sick with either disease specified in Rule 10 is placed. The room must have no carpet, simply rugs; must previously be cleared of all needless clothing, drapery and other material likely to harbor the poison of the disease. Provision must be made for the introduction of a liberal supply of fresh air, without sensible currents or drafts.

13. The discharges from the throat, nose and mouth are considered extremely dangerous, and those from the skin, eyes, ears, kidneys and bowels are also dangerous, and remain so for a considerable time. Small pieces of rags should be substituted for handkerchiefs, and after having been once used must be burned immediately.

14. The discharge from the patient's bowels or bladder must be received into vessels containing a solution of corrosive sublimate, which being a deadly poison, should be so labeled as to avoid accidents, or a strong solution of carbolic acid or some other disinfectant, and if not buried at once

must be thrown into a cesspool or water closet, after having been thoroughly disinfected, but *never* into a running stream. If buried it must not be within 100 feet of any well. All vessels must be kept scrupulously clean and disinfected.

15. Nurses and attendants must keep themselves and their patients as clean as possible—their own hands frequently washed and disinfected by carbolic acid solution. The nurses must be few as possible, and they must not unnecessarily communicate with other persons. They must wear only such clothes as may be readily washed, which, when removed, must be placed immediately in boiling water and boiled at least thirty minutes. Neither they nor any other person should eat anything in the sick room, or which has been there. Gargling or washing the mouth occasionally with a cleansing fluid is recommended for those much exposed to the contagion of the disease.

16. Food left uneaten by the sick must never be carried where it will infect other persons. It must be burned immediately on removal from the sick room and the dishes used washed in boiling water by themselves, never with other dishes.

SMALL-POX.

Vaccination is the only preventive for small-pox. Hence it is important that the vaccination be thoroughly done, with reliable lymph free from all impurities, and with sufficient frequency.

Immediate vaccination after exposure is important for safety. It should be done, if possible, within five days after exposure.

Every infant should be vaccinated within three months after its birth, unless an educated physician advises to the contrary. Should the first attempt fail it should be repeated at intervals of a fortnight until a true sore is produced.

Every child should be revaccinated before it reaches its *twelfth year.*

DIPHTHERIA.

Diphtheria is a most formidable disease, is widely prevalent and one of the most fatal diseases in this State. It is generally admitted to be produced by a specific bacillus, which by multiplication produces blood poisoning. It attacks persons of all classes and ages, but most frequently children under sixteen years of age.

In ordinary cases the germ producing diphtheria probably attacks the person by way of the mouth and the air passages.

The period of incubation of diphtheria, or the time from a person's exposure to the disease to his coming down with it, like scarlet fever, varies somewhat—being usually from a few hours to seven or eight days; in some cases it is twelve or fourteen days.

It has been conclusively demonstrated that the germs of diphtheria retain their vitality in dried dust for an indefinite period of time, and that cold, even to freezing, does not affect its vitality. Hence the importance of destroying by burning or thorough disinfection all the discharges.

Its most frequent local manifestations are in the mouth, throat and air passages. When in the mouth, or upper part of the throat only, the disease is, as a rule, less dangerous and fatal, but none the less contagious, than when in the air passages, below the fauces.

17. Membranous croup must be treated as contagious, and be considered for all sanitary purposes as identical with diphtheria, and all rules applying to the latter apply equally to membranous croup.

Avoid exposure to the disease.

Observe rigidly every measure as given for Scarlet Fever.

Beware of crowded assemblies in ill-ventilated rooms.

All influences which depress the vital powers and vitiate the fluids of the body tend to promote the development and spread of this disease. Among these influences perhaps the most common and powerful are *impure air* and *impure water.*

SCARLET FEVER.

Scarlet fever is now believed to be one of the most contagious diseases. One attack does not always prevent subsequent attacks. The greatest number of deaths from this disease is of children under ten years of age. Adult persons do sometimes have the disease.

Scarlatina and scarlet rash are identical with scarlet fever—equally dangerous and equally contagious. They are one and the same disease.

Avoid the special contagium of the disease. This is especially important to be observed by children. Children under ten years of age are in much greater danger of death from scarlet fever than are adults, but adult persons often get and spread the disease. and sometimes die from it. Mild cases in adults may thus cause fatal cases among children. Because of these facts it is frequently dangerous for children to go where adult persons go with almost perfect safety to themselves.

It is probable that the contagium of scariet fever may retain its virulence for some time, and be carried for a long distance in various substances and articles in which it may have found lodgment. While it is not definitely *proved* that the germs of scarlet fever are propagated in any substance outside the living human or animal body, *it is possible that they may be found to be thus propagated.* Therefore, and because the breathing of air laden with emanations from decaying meat, or from sewers, cesspools, sinks and other receptacles of filth is believed to endanger health, great care should be taken to have the house, premises and everything connected with dwellings, kept clean and dry, to have sewer connections well trapped, and house drains constantly well ventilated, and to have all carriers of filth well disinfected Do not permit a child to enter a privy or water-closet, or breathe the air from a water-closet, cesspool or sewer into which non-disinfected discharges from persons sick with scarlet fever have entered, or drink water or milk which has been exposed to such air.

Do not permit a carriage or hack used for funeral purposes from premises wherein death has occurred from scarlet fever, to be used again until it has been disinfected.

Do not permit a child to ride in a hack or other closed carriage in which has been a person sick with scarlet fever, except the carriage has since been thoroughly disinfected.

Do not permit a pupil of the public school to re-enter school without the necessary certificate that the proper precautions have been observed.

Do not permit a child to attend school from any family or building in which there is a case of diphtheria (membraneous croup), scarlet fever, scarlet rash, scarlatina, or has been such, within a period of thirty-five days previous. Public schools are a most prolific source for the spread of this disease.

Do not handle or wear clothing worn by persons during their sickness or convalescence from scarlet fever.

Do not permit a cat or dog or fur-bearing animal to enter a room where a person is sick with scarlet fever.

Beware of any person who has a sore throat. Do not kiss such a person nor take the breath of such a person. Do not drink from the same cup nor use any article that has been used by a person sick with this disease.

Remember that scarlatina and scarlet rash are scarlet fever.

MEASLES.

18. Measles is a highly contagious and often fatal disease, hence is dangerous to the public health, and subject to quarantine regulations.

19. Every person known to be sick with measles, or suspected to be sick with that disease, must be isolated from all other persons except the necessary attendants fifteen to twenty-one days.

20. A danger signal must be placed upon the premises in some conspicuous place; all children of the family must be restricted to the home, and no visiting permitted. Heads of families doing outside labor, and not nursing the sick, may go about their usual vocation, keeping aloof from other children, subject to Rule 5.

When the sick have fully recovered, and there are no more exposures, and the rash, scurf and cough have disappeared, the quarantine may be removed although the twenty-one days may not have elapsed.

The specific poison or infection of measles is in the rash which invades the membranes of the nose, throat, lungs and bowels before and often more severely than the skin, so that it is infectious before the eruption appears on the skin.

This disease comes on like what is commonly called "a cold in the head," eyes watery and red, sensitive to light; watery discharge from the nose; fever, hoarse, dry, husky and painful cough; an eruption in the roof of the mouth, with or without sore throat. The eruption does not appear before the second or third day—first on the forehead and face—is in patches and of dull red color, and the skin has a roughened feel to the touch.

Mothers can do more than all others to prevent the spread of the disease, because they see the first symptoms and can promptly send the child to bed and isolate it until the true nature of the disease is determined. This early action, a hot bath, and a few days rest and quiet will promote the safety and recovery of the sick, and also the safety of the other children of the family. In no one of the contagious diseases can the mother give greater aid, and in none is her co-operation more desirable.

WHOOPING COUGH.

21. Whooping cough is an infectious disease. A pupil of the public schools affected with it must be excluded from the schools until entire recovery. He should be isolated from all other children. There is no necessity for quarantining adult members of the family, or the premises, except to exclude children from schools and public gatherings. The premises must be placarded.

TYPHOID FEVER.

It is the opinion of the best and most experienced sanitarians that typhoid fever is a disease which has no right to exist. That it is the result of a specific germ. That it is a filth disease,—not that it is alone produced by filth. There must be a specific germ, and this germ must through the mouth as food or drink, enter the small intestines, where it multiplies enormously, and is thrown off in the excreta, to again multiply under the favoring conditions of moisture and heat. Hence the disposal of the excreta of a typhoid fever patient is of the highest importance. The most dangerous source of infection is from water. The discharges are thrown in a privy vault, on a manure pile, or on the ground, whence they sink into the earth, through the soil, even a mile into the well.

There are many other ways in which water may be contaminated. The soiled clothing of a patient is washed and the water thrown upon the earth near a well, or poured into a leaky drain. Some kinds of food are very absorbent of disease germs; the most notable is milk which becomes contaminated by being kept too near a patient. Several instances are known where milkmen have carried the germs of this disease in milk kept where the sick were, or by rinsing their cans with impure water.

The disease is not considered contagious in the sense that small-pox, measles, scarlet fever, and diphtheria are, yet it has been practically demonstrated that the germs may enter the system through the respiratory tract, as sewer air. Attendants upon those sick are not in danger from contracting the disease directly from the patient. It goes through families, because every individual, usually has been exposed to the producing cause,—the disease germs,—first through contaminated water or food, then the house surroundings.

Protect the water supply from any possible source of contamination. The water supply of cities and towns should be procured from sources where there can be no contamination, immediate or remote, from privies, cesspools, stables or cemeteries.

Great care should be had to prevent the contamination of the water supply by discharges from the bowels of a person sick with typhoid fever, as by drainage into wells, springs, streams or other water supply, from a privy vault, sewer, drain or cemetery. Privies often drain into wells, unsuspected by those who use the water. Should typhoid discharges pass into such a privy an outbreak of typhoid fever among those using the water from a neighboring well would be likely to occur. If such a well were the source of the general water supply of a city, typhoid fever might soon be epidemic there.

The use of water from a source likely to be infected with excreta from a typhoid fever patient should be promptly stopped. Great care should also be given to the milk supply.

There is good reason to suspect the water of a well whenever a vault is situated within a hundred feet of it, particularly if the soil be porous. In numerous instances fluids from excreta have leached into wells from much greater distances; and it has been proved that a well thirty rods from a cemetery received water which had filtered through the soil of the cemetery.

Dangerously contaminated water may be, and often is, found to be clear and colorless, and to have no bad taste.

Keep the premises pure and clean as possible. Of all forms of filth none are so dangerous to houses as the "hole-in-the-ground" privy, and the sink-drains.

All discharges from the patient should be received in a vessel containing a pint or more of a solution of chloride of lime (six ounces of lime to one gallon of water), and kept covered three or four hours, and then buried in the earth, at such distance from wells, springs, or streams that they cannot possibly be drained therein. Never mingle them with any kind of filth, in a privy or elsewhere.

All soiled clothing and bedding soiled with discharges from the patient should be at once removed and placed in a tub and completely covered with a solution of chloride of lime, and kept there until they can be boiled, or put in boiling water as soon as removed from the patient. It is important that this should be closely observed, otherwise the substance on the clothing dries, becomes dust, floats in the air and endangers the attendants. It is probable that in this way washer-women often become infected and have typhoid fever. After this disinfection the clothing may be washed with safety.

During sickness, disinfect at once carefully any spots on floor, carpet or rug accidently soiled.

There is no necessity for burning the clothing, bedding and bed of a typhoid fever patient even when death occurs, nor for a private funeral, but the coffin must not be opened in any church, hall, place of public assembly or residence.

Strict isolation of the sick, and placarding the premises are not necessary, but it is wise, for all who can properly do so, to keep away.

After death or recovery, disinfect the sick room with sulphur fumigation and then wash the floors and woodwork with a solution of corrosive sublimate or carbolic acid.

Nurses and others in the family should eat nothing in the room where the patient is, nor anything that has been there. The food for the family and attendants should be prepared and kept as far as possible from the sick. As boiling will kill all disease germs, it is safer when the disease is in the house, to boil all water and milk just before using.

It is especially important that the *contents* of the privy be disinfected. For this purpose use four ounces of the best quality of "chloride of lime" to each gallon of material in the vault.

PUERPERAL FEVER.

Puerperal fever is a fearfully fatal disease. Hence, every attendant upon cases of labor should, by the use of antiseptic measures, sedulously guard against the occurrence of the disease. The hands and all instruments and appliances should be washed in a solution of corrosive sublimate (one to one thousand parts), and all discharges subject to decomposition, and capable of producing septicæmia, should be promptly removed and destroyed. The only way to avoid this terrible disease, is for every practitioner to recognize his personal responsibility in the matter, and he who does not is guilty of criminal negligence.

THE DEAD.

22. A body dead from Small-pox must be immediately wrapped in a cloth saturated with the strongest disinfectant solution, without previous washing, and buried deep, and no body dead from this disease shall under any circumstances, or any lapse of time, be disinterred.

23. The body of a person who has died from Asiatic cholera, typhus fever, yellow fever, leprosy, diphtheria (membranous croup), scarlet fever (scarlatina or scarlet rash), or measles, must not be removed from the sick room until it has been wrapped in a cloth saturated with a solution of corrosive sublimate (one ounce to six gallons of water), and then tightly enclosed in a coffin. The body shall then be buried immediately, without the attendance of any person other than is necessary for the interment thereof.

24. NO PUBLIC FUNERAL shall be held of any person who has died from either of said diseases named in Rule 23, and no public funeral shall be held in a house, nor on any premises where there is a case of, nor where a death has recently occurred from, either of said diseases.

25. No person, company, corporation or association having charge of, or control of, any schoolhouse or church, or of any building, room or place used for school or church purposes, or for any public assembly, shall permit the body of any person dead from any of the contagious or infectious diseases named in these regulations, or any other dangerous contagious disease, to be taken into such schoolhouse, church, building, room or place, for the purpose of holding funeral services over such body; and no sexton, undertaker, or other person having charge of or direction of the burial of any body dead from any of the said diseases, shall permit the coffin or casket containing such body to be opened in the presence of any child; nor shall any child be permitted to act as pall-bearer or carrier at any such funeral.

26. No hack, omnibus, street car or other closed vehicle used for the conveyance of the living, shall be permitted to carry the body of any person dead from an infectious or contagious disease; nor with the knowledge of the owner, driver or person in charge thereof, to carry any person or article liable to communicate the infection or contagion of such disease. And any railroad car, street car, omnibus, cab, hack or other vehicle, in which a person has been carried affected with any of the diseases named herein, shall be forthwith removed from service and be disinfected before being used again.

No dead body of a human being shall be buried within a city or incorporated town, nor in any burial place used or controlled by any city or incorporated town within this State, without a burial permit issued and signed by the clerk or recorder of such city or town. A burial begins when the body is prepared for burial.

DISINTERMENT.

27. Whenever it is desired to disinter the body of a human being for removal or transportation, a separate application for permission so to do must be made to the State Board of Health for each body to be disinterred, on blanks furnished by the State Board.

The application must state the full name of the deceased, also the age, cause of death, date of death, name of physician who made the certificate of death, place of burial, and where to be reinterred.

28. No disinterred body must be received for transportation by any railroad unless accompanied by a special disinterment permit from the State Board of Health, which is additional to the regular transportation permit.

29. The disinterment permit must be approved by the local board of health of the jurisdiction where the body lies buried.

30. Depositing bodies in a receiving vault is deemed a burial, and a disinterment permit will be required for removal of a body therefrom.

31. A body dead from diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), small-pox, Asiatic cholera, leprosy, yellow fever, or typhus fever, must not be deposited in a receiving vault.

32. A receiving vault in which is deposited a body dead from Asiatic cholera, small-pox, diphtheria (membranous croup), leprosy, scarlet fever (scarlatina, scarlet rash), yellow fever, or typhus fever, must not be opened for the removal of such bodies nor for the deposit of bodies dead from non-contagious diseases, nor for the entrance of living persons, and no permit will be granted for the removal of such bodies from such vault.

33. Where the disinterment is for the removal of bodies to another part of the same cemetery, or to a contiguous cemetery, the removal must not be by any public conveyance. In such cases it is not required that the bodies shall be prepared as for transportation by railroad or other public conveyance. But a disinterment permit, approved by the local board, must be obtained for each body disinterred.

34. Every transportation permit where the cause of death was a contagious disease, or any complication thereof, must in addition to approval by the local board of health, be approved and countersigned by the health officer of such local board as a protection against improper shipment.

35. Children must not be permitted to be present at disinterments.

36. No permit will be granted for disinterment in any case of a body dead from Asiatic cholera, small-pox, leprosy, typhus fever, yellow fever, scarlet fever (scarlet rash, scarlatina), diphtheria (membranous croup), or from any sequelæ of or complications of said diseases.

37. Where the cause of death is given as "heart failure," and the age of decedent is under thirty years, it must be deemed as suspicious, and no railroad transit permit be issued thereon by a local board until investigation is made by the health officer, unless there is a positive statement in the physician's return that the "heart failure" was not the result of diphtheria. ☞ The penalty for the digging up, disintering, removing or carrying away any human body without lawful authority is imprisonment in the penitentiary not exceeding two years or a fine not exceeding $2,500.

38. The transportation of bodies of persons dead of small-pox, diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), Asiatic cholera, leprosy, typhus fever, or yellow fever, is absolutely forbidden.

INSTRUCTIONS TO LOCAL BOARDS.

The Secretary submitted the following Circular of Instructions to Local Boards, Form 99B, which was referred to the standing committee:

[Form 99B.]

INSTRUCTIONS FOR LOCAL BOARDS OF HEALTH.

ORGANIZATION.

The mayor and council of a city or incorported town, and the trustees of a township are the local board of health. The clerk of a city; recorder of a town; or the clerk of a township is the clerk of the local board.

It is only necessary for the board to elect a president, or chairman, from its members, and a health officer, to complete the organization of the board.

MEETINGS.

Local boards must meet on the first Monday in April and October, and at such other times as may be necessary for the protection of the public health. Notice to all members must be given of all irregular meetings. The board cannot delegate any person, or committee to do any act required to be done by the board.

Meetings of the board must be separate and distinct from meetings as trustees. When in session as trustees, they must adjourn or take a recess, and re-convene as a local board. This, for the reason that the local board is created, and derives its powers under a different statute, than that of trustees. They cannot act as a local board when sitting as trustees. It is important that these distinctions be understood and fully observed, as frequently large expenses are incurred by local boards, and the supreme court says such boards must act in the manner prescribed by statute.

The same rule applies to local boards of cities and towns.

All proceedings of a local board should be kept in a separate record, and should embrace every action of the board.

COMPENSATION.

The statute creating local boards makes no provision for the compensation of such boards, but it is provided in the Code, that township trustees shall receive "for each day's service of eight hours necessarily engaged in official business, to be paid out of the county treasury, two dollars each." When engaged in the duties of a local board, the trustees are engaged in official duties imposed by the statute. The same rule applies to the clerk.

The statute provides that the local board shall fix the compensation of all persons employed by them in the execution of the health laws, of their own regulations, and regulations of the State Board. The presumption of law is that these expenses are to be paid in the same manner as other expenses of the township. Whoever is employed, the employment must be by the local board, not by any member of the board, nor by a committee of the board.

EXPENSES.

The statute says all expenses incurred in the enforcement of the health law "shall be paid by the town, city, or township, in either case all claims to be presented and audited as other demands." In the case of townships the trustees shall certify the amount required to pay such expenses to the board of supervisors of the county, and it shall advance the same, and at the time it levies the general taxes, shall levy on the property of such township a sufficient tax to reimburse the county, which, when collected, shall be paid to and belong to the county.

REGULATIONS.

Local boards must adopt such regulations as are necessary for the protection of their jurisdiction, regarding nuisances, sources of filth, and causes of sickness, etc.; and also enforce regulations made by the State Board of Health.

Regulations when adopted must be put on record and public notice given by publication or posting. The State Board has prepared regulations suitable for posting in townships, which will be sent to local boards upon a request for Form 28B.

It is not sufficient for a local board by resolution to merely adopt regulations of the State Board. The specific regulations must be named, a copy thereof marked for identification, and filed in the clerk's office, and the facts put on record.

To render one liable for violation of an order of a board of health there must be legal evidence that the order was made by the board. The mere service of notice is no evidence of the action of the board. There must be record evidence of the action of the board regarding the subject matter, as the removal of a nuisance, or the incurring of expenses.

It is the duty of local boards as public officers, to provide all possible protection to the lives and health of the people of their jurisdiction. The statute says they shall do this. For neglect of official duty they are liable to heavy penalty. Not only this, the courts have established the rule that the corporation of which they are such officers is liable to damages for injuries sustained by reason of neglect of official duty of such officers. Every stagnant body of water, with green slime throwing off noxious vapors and disease; every filthy, stinking alley with accumulated garbage and rotting manure; filthy stock yards; noxious waste from creameries; every cesspool and privy exhaling disease, comes within the purview of the duties of a local board. A city or town may enforce regulations made by the local board of health by the enactment of an ordinance providing a penalty for any violation of such regulations.

JURISDICTION.

Local boards have no jurisdiction beyond the limits of the territory of which they are the board. Where a town is within a township, the township board has no jurisdiction within the town. It may quarantine against the town whenever deemed necessary. Where a city or town embraces an entire township the local board of the city or town has superior jurisdiction.

Mumps and whooping cough are infectious diseases, and a child infected with either must be excluded from the public schools, and isolated from other children until recovery.

There is no necessity in quarantining adult members of a family in cases of mumps and whooping cough, nor in quarantining the premises, except to exclude children.

Quarantine applies to all institutions, public or private, city, county, or State.

Quarantine against persons or premises must not cease until thorough disinfection is had, and there is no further danger from infection.

While certain duties are devolved upon the mayor and clerk, under the law, these officers are subject to the general powers of the local board.

Quarantine means the complete isolation of the sick from the well, except the physician and nurses. The quarantine must be maintained the prescribed period succeeding the appearance of the last case of the disease in the family, or on any premises, except that whenever there is complete recovery of persons who have been sick with a contagious disease, and there are no further exposures thereto, the quarantine may be released, although the period prescribed herein has not elapsed. *Provided*, that no release of quarantine shall be permitted until at least seventeen days after the recovery of the last case, and proper disinfection of person and premises is made. The attending physician cannot order, establish, maintain nor release quarantine.

HEALTH OFFICER.

The statute requires every local board of health to appoint a "competent physician" as health officer. The provision is mandatory, not directory. The local board has no discretion in the matter; the statute says they *shall* appoint. The presumption of law is that he is to be the sanitary adviser and counsel of the board.

He should be competent to diagnose correctly all contagious and infectious diseases. He should be a person of practical, professional experience, and of good judgment and discretion. He should be the most "competent physician" obtainable, as the statute makes competency the required qualification It makes no difference to what school of medicine he belongs.

A physician who is a member of a local board may be also the health officer of the board, but he must be elected to the office.

The powers and duties of a health officer must be previously given by a local board when in session, and must be of record. He has power to do whatever is authorized by the local board, not in contravention of the statute, the rules and regulations of the State Board, or the lawful powers of the local board.

He is an advisory counsel of a local board in sanitary matters, and not an executive officer, except when acting by order of the local board.

It is not his duty to attend persons quarantined for contagious diseases. The sick may employ whom they please to attend them during sickness, except in the case of paupers, as provided in the Code, and neither the health officer, nor local board can interfere. It is not his duty to assist an undertaker in preparing for burial the body of a person dead from contagious disease, unless so specially directed by the local board as a protective measure.

It is not his duty to verify the statement of an attending physician as to suspected cases of contagious disease. Whenever well authenticated symptoms lead to a certainty that the attending physician is in error in diagnosis, it is the duty of the board to direct the health officer, or other person, to visit the case, but, such visit should not be made except after notice to the attending physician, and a courteous recognition of his professional rights.

It is not his duty to put up danger signals. That should be done by some police officer, constable or specially delegated officer.

It is not his duty to disinfect quarantined premises. That should be done under the supervision of the attending physician, or some member of the board, acting by advice of the health officer. Upon the occurrence of small-pox within his jurisdiction he must report the same by telegraph, if there be no telegraph, by mail, to the State Board, and this whether the case be mild or severe, or modified by vaccination.

It is his duty to study the cause, rise, progress and decline of any epidemic disease in his jurisdiction and report the same to the State Board, on subsidence of the disease.

It is his duty, by statute, to make a report to the State Board, on blank forms furnished by the State Board, of statistics, concerning the jurisdiction of which he is the health officer. If he is the health officer for a township, and a city or town within a township, or more than one township, he must make a separate report for each board, just as distinct and separate as though made by different persons.

He must be a lawful physician—holding a certificate of authority to practice medicine from the State Board of Medical Examiners. The State Board of Health will not recognize any but lawful physicians as health officers of local boards. It is doubtful if a local board can appropriate public money to pay for the services of a person not lawfully qualified to perform the service.

He is a public officer, and must take the oath required of every civil officer before entering upon the duties of his office. He must be a citizen of the State, but not necessarily an elector or voter of the place where he is elected, hence he may be the health officer of more than one local board.

No compensation is fixed by statute. That must be done by the local board. If given an annual salary, such salary will be deemed by law in full compensation for all services rendered in connection with the duties of his office, unless the board otherwise provide. The presumption of law is that his compensation will be paid in the same manner as other expenses of the city or township, except in cases of quarantine of contagious diseases, the expenses of which are to be paid by the county if the persons quarantined are unable to pay.

NUISANCES.

Local boards must make such regulations respecting nuisances, sources of filth, and causes of sickness as they shall judge necessary for the public health and safety.

While the statute gives the board the discretionary exercise of judgment as to what they may deem necessary for the public health, the intent and purpose of the whole statute is the protection of the public health, and it is mandatory. The statutes have defined clearly what are nuisances.

A nuisance is anything done or permitted which injures or annoys another in the enjoyment of his legal rights. Every person has the legal right to the fullest enjoyment of his life and health. Therefore anything which injures or annoys the public in the enjoyment of life or health is a nuisance, which it is the duty of a local board to abate. With nuisances affecting only private interests local boards have nothing to do, as where A complains that a schoolhouse privy situated just across the street from his residence is unsightly. The order of the local board for its removal must be upon the ground that it is dangerous to the public health. An action by A for its removal must be upon the ground that it is dangerous to the public health, and not because it is unsightly and obnoxious to his own residence or premises. A declaration of the local board that it is a nuisance is not necessary as a condition precedent to give A a right of action for damages. The statute does not give local boards exclusive jurisdiction to determine what constitutes a nuisance and to abate nuisances. But if a local board of health finds any decomposing or offensive matter upon private property which, in their opinion, is injurious to the public health, they must first order the owner or occupant to remove it within twenty-four hours. If he neglects to do so they may proceed summarily to cause such nuisance to be removed. If the danger to public health is imminent, and safety requires immediate suppression or abatement of the nuisance, the board of health would be protected if they proceeded at once to suppress it, for the safety of the people is the highest law. If any unhealthy nuisance is found in a public place it is the duty of the board of health to cause its immediate removal.

The State Board of Health has no authority whatever respecting the removal or abatement of nuisances. That authority is vested solely in local boards and the courts.

SCHOOLS.

When a contagious disease appears in a community the schools should not be closed unless the sick outnumber the well and the school becomes decimated. By closing the schools the children are thrown together by intervisiting and play, and the risk of exposure thereby is greatly increased. By continuing the school and isolating the sick the danger of exposure is greatly decreased.

If a pupil is affected the teacher must immediately remove such pupil from the school, and unless the other children in the family go from home to live they, also, must be excluded from the school. The exclusion of pupils is a part of the quarantine regulations, with which neither the attending physician, school directors nor even health officers can interfere.

Should any pupil be attacked with any infectious disease in any school room all the pupils in such room shall at once be dismissed and the school room remain closed until thoroughly disinfected.

If a teacher is boarding in a family wherein is a contagious disease he must immediately change his boarding place.

While schoolhouses are by law in the control of school directors, it is within the power of a local board of health to prohibit their use whenever it is deemed necessary for the protection of the public health, and it is their duty to so prohibit their use.

PENALTY.

The statute makes the following provision for violation of regulations of the State Board and of local boards:

"Any person being notified to remove any nuisance, source of filth, or cause of sickness as in this chapter provided, who fails, neglects, or refuses to do so, after the time fixed in such notice, or knowingly fails, neglects, or refuses to comply with and obey any order, rule, or regulation of the State or local board of health, or any provision of this chapter after notice thereof has been given as herein provided, shall forfeit and pay the sum of twenty dollars for each day he refuses such obedience, or for each day he knowingly fails, neglects, or refuses to obey such rule or regulation, or knowingly violates any provision of this chapter, to be recovered in an action in the name of the clerk of the board, and when collected to be paid to the clerk of the town, city, or township, as the case may be, and for its benefit; and in addition thereto, any one so offending or knowingly exposing another to infection from any contagious disease, or knowingly subjecting another to the danger of contracting such disease from a child or other irresponsible person, shall be liable for all damages resulting therefrom, and guilty of a misdemeanor."

The committee presented the following report which was adopted:

The Committee on Publications and Papers, to which was referred the circular relative to quarantinable diseases, Form 130B., report favorably upon the recommendation of the Secretary, and advise that two thousand copies be printed; also report the same relative to the circular of Instructions to Local Boards of Health, Form 99B., and recommend that two thousand copies be printed. (Signed)

W. BANCROFT,
J. M. EMMERT,
R. E. CONNIFF.

VITAL STATISTICS.

The Secretary submitted the following forms for securing vital statistics under the provisions of the acts of the special session of the Twenty-Sixth General Assembly, which were adopted:

RECORD OF BIRTHS.

Name of child.	SEX.		DATE OF BIRTH.			Place of birth. Town or Twp.	Mother's full maiden name.	Father's full name.
	M.	F.	Mo.	Day	Yr.			

RECORD OF DEATHS.

Full name of deceased.	AGE.			Occupation.	DATE OF DEATH.			Married, single, widow, or widower.
	Y.	M.	D.		Mo.	Day.	Yr.	

Where born.	Place of death. (Town or townsihp.)	Cause of death.	Place of burial.

ASSESSOR'S RETURN OF BIRTHS.

Full name of child............... sex........ date of birth, month..... day...... year...... place of birth (town or township) .... mother's full maiden name............. full name of father.............

ASSESSOR'S RETURN OF DEATH.

Full name of deceased............. sex........ age, years......months ..... days..... occupation.......... date of death, months...... days..... years...... single, married. widow, or widower................where born .... place of death (town or township) .... cause of death........... place of burial.............

TUBERCULOSIS.

Dr. Emmert presented a paper upon the prevention of tuberculosis, which was heartily approved and ordered printed. It will be found in another place in this report.

HOG CHOLERA.

The committee on Infectious Diseases of Animals submitted the following, which was adopted:

WHEREAS, The Legislature, at the request of his excellency, Francis M. Drake, Governor of Iowa, has recently passed a bill requiring State and county officials to coöperate with the Department of Agriculture at Washington, D. C., in the experiment of the federal government to control and stamp out hog cholera, be it

Resolved, That we, the members of the Iowa State Board of Health, are in sympathy with the movement, and ask the local boards to join in coöperating with the Department of Agriculture in this special attack upon the fell destroyer of our swine industry; and that we recognize and appreciate the deep interest shown in this movement by the Hon. James Wilson in the financial welfare of our swine breeders and feeders.

(Signed.) J. I. GIBSON,
R. E. CONNIFF,
E. A. GUILBERT.

ELECTION.

Dr. J. M. Emmert was unanimously elected President of the Board for the ensuing year, and Dr. J. F. Kennedy was re-elected Secretary and editor of the Bulletin.

Prof. S. R. Macy, Highland Park College, Des Moines, was elected Chemist to the Board, and Dr. Eli Grimes, of Des Moines, Bacteriologist.

Drs. Emmert and Bancroft were elected to represent the Board in the next meeting of the American Public Heath Association, to be held at Philadephia, Pa.

Drs. Guilbert and Shrader were elected to represent the Board at the Annual Conference of State Boards of Health to be held at Nashville, Tenn.

Dr. Emmert on taking the President's chair, announced the following standing committees for the year.

STANDING COMMITTEES.

Auditing—Dickinson, Shrader, Gibson.
Animals—Gibson, Shrader, Scroggs.
Communications—Guilbert, Bancroft, Conniff.
Contagious Diseases—Shrader, Bancroft, Carter.
Corpses Bancroft, Guilbert, Dickinson.
Food and Water—Guilbert, Conniff, Scroggs.

Kerosene—Carter, Gibson, Shrader.
Legislation—The Board.
Library—Conniff, Scroggs, Guilbert.
Plumbing—Dickinson, Carter and the Secretary.
Printing—Carter and Dickinson.
Publications—Scroggs, Gibson, Shrader.
Rules and Regulations—Remley, Guilbert, Gibson.
Schools—Carter, Bancroft, Conniff.
Tuberculosis—Shrader, Gibson, Bancroft.
Ventilation—Scroggs, Shrader, Carter.

FUNCTIONS OF THE STATE BOARD OF HEALTH.

An erroneous opinion very generally exists throughout the State as to the powers and functions of the State Board of Health.

Under the new Code, the following sections contain all the powers and duties of the Board, which are found in Chapter sixteen, Title XII.

SEC. 2565. The Board shall have charge of and general supervision over the interests of the health and life of the citizens of the State, matters pertaining to quarantine, registration of marriages, births, and deaths, authority to make such rules and regulations and sanitary investigations as it from time to time may find necessary for the preservation and improvement of the public health, which, when made, shall be enforced by local boards of health and peace officers of the State. It shall prepare and furnish through its Secretary to the clerks of the several counties, such forms for the record of marriages, births and deaths as it may determine upon, and by its Secretary make biennial reports to the Governor, which shall include so much of its proceedings, such information concerning vital statistics, such knowledge respecting diseases, and such instruction upon the subject of hygiene as may be thought useful for dissemination among the people, with such suggestions as to further legislation as may be thought advisable.

SEC. 2574. The Secretary of the State Board of Health shall receive such salary as the State Board shall fix, not to exceed twelve hundred dollars yearly, payable upon the certificate of the President to the State Auditor, who shall issue his warrant for the amount due upon the State Treasurer. Each member of the Board shall receive only actual traveling and other necessary expenses incurred in the performance of his duties, such expenses to be itemized, verified, certified, audited, and a warrant drawn therefor in the same manner as the Secretary's salary.

SEC. 2575. The sum of five thousand dollars, or so much thereof as may be necessary, is annually appropriated to pay the salary of the Secretary, expenses of the Board, contingent expenses of the Secretary's office, and all costs of printing; all such contingent and miscellaneous expenses to be itemized, verified, certified, audited, and paid as other expenses of the Board.

The theory of this statute is to vest in *local boards* the authority to protect the public health, prevent and control contagious diseases, and abate nuisances affecting the health of the public. To this end the remainder of the chapter, with the exception of sections 2564, 2566 and 2567, is made directory to such boards, and it is only in cases of emergency that the State Board is given authority to enter their jurisdiction with superior authority.

The powers and duties of the State Board are so clearly defined they cannot be misunderstood. There is much that might be done beneficial to the public health outside of the present means of the Board, and which would be energetically undertaken, but for the limitations of the statute. A noticeable instance in this respect is that of nuisances.

Frequent application is made by petition of citizens to the Board to aid in securing the removal of a nuisance caused by a stock-yard or a creamery, averring they are unable to secure relief through their local board because members of the board are owners of, or have pecuniary interest in the causes of the nuisance. There are also complaints of slaughter-houses, improper sewerage or drainage, hog-pens, unburied dead animals, etc., all of which are, or may become greatly injurious to the health of the community wherein they exist.

The Board is regretfully compelled to turn a deaf ear to such requests for the reason that the statute has given it no authority to abate a nuisance or make any order therefor. The authority to do so is vested in local boards, and it is made their duty to provide such regulations, and take such action as will protect the public health and prevent the doing of anything which injures or annoys the public in the fullest enjoyment of life and health. Whatever contaminates the air and water of a community is a nuisance.

Where a local board neglects or refuses to act in relation thereto any citizen may petition the district court for an injunction against the nuisance. An action may also be brought against the members of the local board for neglect of official duty. The city or township is also liable for all damages that may accrue by reason of the neglect or malfeasance of such local board. For instance, there is an outbreak of small-pox or diphtheria, or any preventable contagious disease; or there may be a nuisance in the community injurious to the public health, and the local board of health neglects or refuses to take the necessary measures to prevent and abate the same, whereby there is loss and damage to the individual, the board would be liable for such loss or damage, and in the event of loss of human life they would be clearly liable to indictment for manslaughter.

Local boards should thoroughly understand their duties and responsibilities under the law and execute them faithfully and impartially. The people have the right to expect and demand that this shall be done. The expediency of a statute is not a question for local boards to determine. Their duty is to execute the law as it is, not as they or even their community may think it should be. If they cannot and will not do this they should resign their office.

Another mistake in regard to the functions of the State Board of Health relates to the practice of medicine. This Board has no jurisdiction whatever in such matters. Indeed the only reference in the old Code to physicians and midwives was a requirement to register their names and addresses with the clerk of the court of the county in which they practiced, and to report to such clerk all births and deaths occurring within their practice. Under the new Code even this small service is not required, and the only reference whatever to physicians is the simple statement that at the annual meeting of the local board a competent physician shall be elected health officer of the board.

The State Board of Health and local boards have nothing whatever to do with issuing certificates to physicians or with the prosecution of physicians or midwives who may be violating the medical practice act—a statute entirely distinct from the statute relating to the State Board of Health. The Board of Medical Examiners only in part consists of members of the State Board of Health.

MILK

IN THE SUNNING YARD.

Probably no article of human food has within the past decade received so much consideration by the medical profession, scientists and sanitary organizations, as milk. It is the universal food, and more especially of children. It is estimated that the milk supply of the United States amounts to about twenty-five and one-half gallons to each person per year, or an ordinary sized tumblerful each day.

Hitherto science has given its effort principally to cheapening and improving butter and cheese. Rarely has it given attention to the milk production of the farm. Sanitarians have recently taken up the work, and special effort is being made to secure pure milk.

"All healthy cows may be trusted to perform their part well in the production of wholesome milk," said Mr. George Abbott in his work on milk legislation. But between the trusty cow and the consumer, and the children especially, stand the nasty barn and yard; the unclean udder; the filthy milker; the unclean milk vessels, the impure water, and the convenient pump, supplemented with dairies, groceries, lunch rooms, and eating houses generally. Added to all these are the present conditions of civilization, especially in cities and towns, respecting hygiene, proper exercise, ventilation, dietetics and dress, which have wrought such deterioration of women as to render them unable to properly nurse their children, thus forcing them to artificial feeding, and to the use of that abominable, murderous invention, the rubber tube and nipple.

These are the objective points of present effort, and it is a pleasure to state that rapid progress is being made to abolish these intervening menaces to the purity of milk for the adult as well as the babe. Already, near the cities of Boston, New York, Philadelphia, Baltimore, Chicago, Montreal, St. Louis, Buffalo, New York, and Providence, Rhode Island, have been established large farms, and laboratories by the Walker-Gordon Laboratory Co., illustrated from photographs in this article, which are thoroughly equipped for the production of milk for use in families and nurseries in its natural condition. The barns and milk houses are constructed and kept in strict accord with the most approved sanitary science. The cows are selected for their milking qualities, and tested with tuberculin before admitted to the herd. They are given the best and most nutritious food. The milk is protected, from the act of milking to its delivery to the consumer, against the danger of infection. The cow and her attendants, with their hands and clothing, are especially guarded against germs of disease. Every vessel used in the milk-house, the glass milk-pails and milkers' clothing are all sterilized, after washing, by apparatus in constant

A MODEL BARN.

ODEL STABLE.

use. So soon as drawn the milk is filtered, cooled, aërated, put into sterilized bottles, and sealed. The milkers wear white clothing while milking, which is washed after each use.

MILK ROOM.

The beneficial result from using milk procured as here shown, has been fully demonstrated in the several cities contiguous to these farms. In the city of New York there was distributed by the health department among the poor people during the year 1896, six hundred and fifty-eight thousand and sixty-four bottles of sterilized milk, the principal distribution being through the months of July and August. The saving of the lives of eight hundred and four children during those two months by the use of this milk is claimed by the department.

A PASTURE.

The city of Brooklyn, for the same year, and the month of August, distributed forty thousand bottles of sterilized milk. Says the report of the Health Commissioner: "Beginning with the last week in June, the infant deaths were twenty-three per cent of the whole mortality of the city; the first week of July, twenty-three per cent; the second week, twenty-eight per cent; the third week, twenty-seven per cent; the fourth week, twenty-one per cent. With the introduction of sterilized milk in the first terrible two weeks of August, the percentage fell to eighteen; in the second two weeks in which the milk was more generally distributed, to eleven per cent."

Similar reports come from other cities where protected milk is distributed. They tell conclusively the intimate connection between the supply of a pure milk diet and the needless infant mortality which goes on every year in crowded communities.

While the demands of small cities would not warrant such elaborate equipments as are cited above, yet much good can be done by a simple plant and moderate expenditure. The purpose of this writing is more especially to show what is being done, and how, in order to lessen the desolation of so many homes.

FILTHY MILKING.

MILK SEDIMENT.

It is not uncommon for consumers of milk to find in vessels in which milk is furnished a sediment at the bottom. It is largely composed of excrementitious matter from the cow, dropping from the udder during the process of milking. The accompanying microphotograph, prepared by Dr. Gray, of the Army Medical Museum, is from a sample of milk taken at random in the milk market at Washington, D. C. It shows the deposit is composed of epthelial debris, hairs of the cow, excrementitious matter, vegetable fibers, organic and inorganic dust particles, bacteria, fungi and spores of every description, fully ninety per cent being excrementitious bacilli, presenting a mass which might well cause the stomach of the average housewife to rebel.

In 1894 the Wisconsin Experiment Station found deposited on the bottom of a milk pail ten inches in diameter, the milk being drawn from the unwashed udder of a stabled cow, sixteen thousand four hundred bacteria. At the same time, where the udder and flank were washed, the number of bacteria was but twenty-six hundred.

EFFECT OF IMPROPER FOOD ON MILK.

In the report of the health officer of the District of Columbia for the year 1895 is the following respecting the effect of food on the milk of a cow:

> The disease described as milk sickness or trembles by some American writers, and characterized by great weakness, constipation, vomiting, fetor of breath, and muscular twitchings, is believed to be due to cows feeding on Rhus toxicodendron. The evidence on this subject is, however, conflicting. Cases of diarrhœa, and even severe forms of gastroenteritis, have been traced by Sonnenberger, Ratti, and Mackay to the milk of cows and goats feeding upon meadow saffron and euphorbiaceous plants. The milk of animals fed on carrot and turnip tops and often from the first spring pasture is changed in an unaccountable manner, and has frequently caused vomiting and diarrhœa in hand-fed children. Husemann regards among the meadow plants apart from different species of Euphorbia and Ranunculus, also the Gratiola officinalis, Aethusa Cynapium or fool's parsley, Cytisus Ramentaceus, and different varieties of sor el and mushrooms especially objectionable.
>
> The milk of swill-fed animals has often a peculiar taste and odor, and is said to cause hyperacidity of the urine and consequent eczema. M. Toussant called attention to the fact that in the district of Argenteuil deaths from gastro-intestinal diseases have increased in frequency among bottle-fed children since the establishment of a large distillery, the cows being fed on brewers' grain and other distillery products, and the milk presented an acid reaction. But this acidity is by no means constant, as Uffelmann and Ohlsen have often found it alkaline. Ostertag states that the milk of animals fed with expressed sugar beets is destructive to calves on account of the excess of potassium, and hence objectionable for human consumption. Bollinger reports injurious effects from ricinus oil cakes, and Schmidt-Mühlheim attributes diarrhœal attacks to the admixture of wild mustard in the rape seed oil cakes fed to cows. Colah quotes Herkemer as saying that cows having inhaled the putrid emanations of a dead and decomposing cow yielded a milk quite unfit for making cheese, and Mr. Smee, quoted by the same writer, asserts that "the milk of cows fed on sewage farms rapidly putrifies." It is quite true that cows, whenever an opportunity affords, feed greedily upon animal and human ordure, and an impure water supply for cattle has frequently been accused of causing an epidemic of milk typhoid. While this connection is not proven, it will be readily understood how the udder can become infected while the animal is wading in filth and polluted streams. All of which clearly indicates the necessity of sanitary control of dairies, enforced cleanliness in milking, and the proper care and feeding of the animals.

Ostertag states that the milk of animals fed with expressed sugar beets is destructive to calves, on account of the excess of potassium, and hence objectionable for human food.

DISEASED ANIMALS—DANGERS OF MILK THEREFROM.

In 1895 the Health Officer of Manchester, England, reported an epidemic effecting one hundred and sixty persons with symptoms of diarrhœa, sickness and abdominal pains, the cause of which was traced direct to their milk supply, which came from cows suffering with garget.

Professor Gaffky reports several cases of acute specific enteritis which he traced to the milk of an animal suffering from that disease. It is more common among herds supplying milk to cities and towns than is generally supposed. A recent instance of milk poisoning from garget is reported by W. R. Stokes, Bacteriologist to the Health Department of the city of Baltimore.

In one of the educational institutions of the city about twenty inmates were suddenly seized with marked nausea, vomiting and purging. Careful investigation was made and the milk used was suspected as the cause. The herd from whence the milk came was visited and one of the cows was found suffering from a swollen udder, and garget, caused, the owner supposed, by a bruise. The udder was thoroughly cleansed and milk drawn in a sterile glass tube, with no contact between the teat and tube. A microscopic examination showed that this fluid consisted almost entirely of pus cells, together with numerous streptococci. The milk from two other cows of the herd also contained about ten to twenty pus cells to the field of a $\frac{1}{12}$ inch oil immersion lens.

These cows were removed from the herd, and all intestinal trouble among the students immediately subsided.

Dr. Booker, of Johns Hopkins University, at Baltimore, in a recent complete research on "Summer Diarrhœa of Children," brings out clearly the relationship existing between certain forms of gastro-enteritis and the streptococcus. The Health Department of the city of Baltimore finds that milk containing more than five pus cells to the field of the oil immersion lens must be excluded from sale and use as food, and cows producing such milk must be removed from dairy herds.

The milk of animals suffering from puerperal and other septic fevers is unfit for food. Escherich, who examined specimens of milk from mothers suffering from puerperal fever, found the pyogenic germs in twelve, and Karlinski found the staphylococci not only in the milk of the mother but in the blood and intestinal contents of the infected infant.

The milk from animals suffering from foot and mouth diseases is equally unfit for food.

Feser, Manolzkoff and Nocard have actually demonstrated the bacillus anthracis in milk; hence the milk of animals affected with ànthrax should not be used.

Nocard has experimentally proven that the virus of rabies may be conveyed in the milk of a cow suffering from that disease. It seems incredible that such an animal should be milked at all.

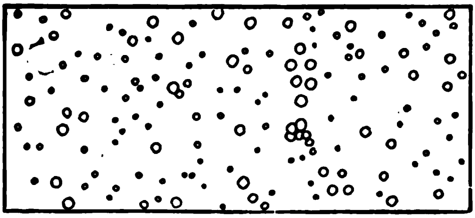
It has long been held that the milk of cows suffering from digestive derangements is of an abnormal character, and, according to Siedamgrotzky, Fröhner, and Braüer, it is usually quite watery, of a bitter taste, and generally coagulates within six to eight hours after milking, with the formation of very little acid, so-called "sweet curdling." When we remember that if nursing mothers indulge freely in fresh fruit and green vegetables their milk is apt to gripe and purge their infants, we can appreciate how cows' milk, under the above circumstances, may produce mischief.

For further facts about milk, the Report of R. A. Pearson, Assistant Chief, Dairy Division, Bureau of Animal Industry at Washington, is cited.

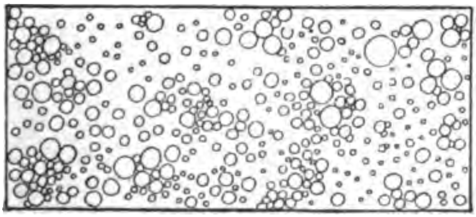
COMPOSITION AND CHARACTERISTICS.

Milk is a whitish, opaque liquid. To the ordinary observer it appears to be a perfect soulution, and is commonly regarded as such, being bought and sold by liquid measure, but when placed under the microscope it is seen to consist of a clear, transparent fluid containing many minute globules of various sizes (fig. 1*b*). The fluid part, called the milk serum, consists of water and all the other constituents of milk except the fat, and these other constituents, although solids when separated and dry, are practically all dissolved in the water, or, as is said, in solution. The globules are little bodies of pure fat scattered through the serum and

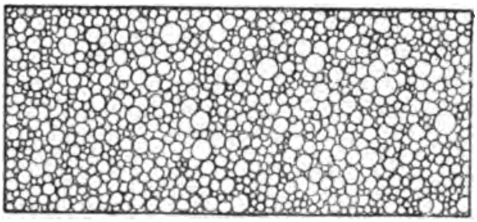
a. Skim milk



b. Milk.



c. Cream.



d. Colostrum.

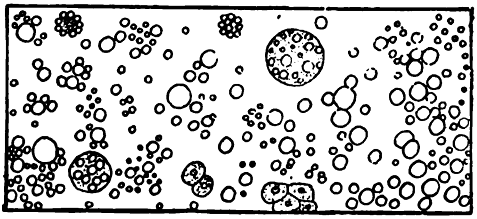


FIG. 1.—Different grades of milk. (Magnified 300 times)

not dissolved; they are semi-solid and form with the serum a mixture called an emulsion.

The solid constituents present in the serum in largest quantity are sugar and casein; albumen and mineral matter are present in small quantity, and there is also a little fibrin resembling the fibrin of blood. There is more sugar in milk than any other solid component, but it is in solution. This milk sugar can be separated and brought into solid form. As solid, it resembles powdered white sugar. It is used to a considerable extent by druggists and in some food preparations, but is not as sweet as cane sugar and its commercial value is not sufficient to induce its manufacture in large quantities. It is the sugar which undergoes the greatest change when milk becomes sour. The casein and albumen of milk are its nitrogenous constituents and are comparable to the white of an egg. Acid or rennet causes casein to coagulate, forming curd and, as such, it is one of the chief ingredients of cheese, constituting about one-fourth of that important food. The mineral matter in milk, called ash or salts, is the indestructible part that remains when milk is evaporated to dryness and burned; this consists chiefly of phosphates and chlorides of soda, potash, and lime.

It is well known that when sugar is dissolved in water the solution is less limpid than pure water, and if many small bodies a very little lighter than water were thoroughly mixed into the solution their rise would be more or less retarded by the stickiness of the surrounding fluid. Milk might be compared to a thin syrup with many fatty and light particles floating in it, as just described. It is viscous or sticky, because of the solids held in solution, and this viscosity, together with fibrin, has a considerable effect in retarding the rise of the fat globules and the formation of the cream layer. The older milk is, the more effective are these forces. The fat globules are so small that a single drop contains many millions of them. It is said that if a person should attempt to count the globules in a drop of milk it would take ten years of his time, provided he counted at the rate of one hundred per minute and worked ten hours per day six days every week. Such a number is too large to be appreciated. The globules average about one ten-thousandth of an inch in diameter, and twenty-five of average size placed side by side would about represent the thickness of ordinary writing paper. Globules of different sizes are found in the milk of any cow, but with certain breeds the size is uniformly larger than with other breeds. The milk of Jersey and Guernsey cows has this peculiarity, which explains why the cream rises so readily on it and why the skim milk is so thin and poor, large globules naturally being able to get to the top more quickly than small ones, many of which cannot rise at all.

One hundred pounds of good milk contains about the following amounts of the different constituents: Eighty-seven pounds of water, four pounds of fat, five pounds of milk sugar, $3\frac{3}{10}$ pounds of casein and albumen, and $\frac{7}{10}$ pound of mineral matter or salts. These proportions are graphically shown by figure two on the next page.

These constituents vary between wide limits; the total solids of milk may be as low as ten or as high as eighteen parts in one hundred. This variation is due to several causes, some of which are given later. The fat varies in quantity more than any other part of the milk, running as low as two parts in one hundred and as high as seven; the larger the proportion of fat the richer is the milk. Most of the States and many cities have a legal standard for the composition of milk, and any falling below this standard is legally regarded as adulterated although it may be, in fact, the pure and natural product. The laws usually require three or three and one-half per cent of fat, and nine or nine and one-half per cent of "solids not fat." (This term is commonly used to designate all the solid substances of milk other than fat.) The "total solids" required thus vary from twelve to thirteen per cent, according to different laws, which means, of course, that in every one hundred pounds of milk there shall be twelve or thirteen pounds of solid matter. These legal requirements are justified by the fact that it is the solid matter and not the water which gives value to milk.

The fact that the standard so often relates to the proportion or percentage of fat, and the popular impression that milk is without value after the cream has been removed, lead some people to think that fat is the only valuable part of milk. This is a great error, as casein is one of the cheapest forms in which such food can be obtained, and is more nutritious than similar compounds in most other foods. It is, however, safe to judge of the quality and value of milk by the fat it contains, because the greater the proportion of fat the greater is the quantity of the other valuable parts, or "solids not fat."

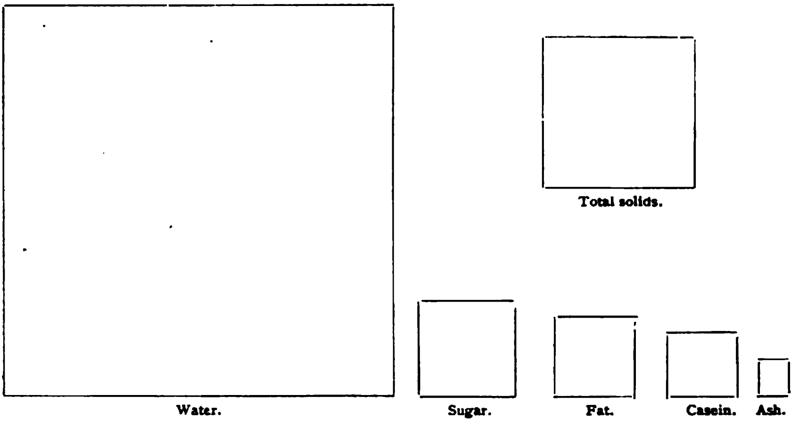


FIG. 2.—Proportions of the component parts of milk.

CAUSES OF VARIATION IN THE COMPOSITION OF MILK.

The proportion of constituents in milk depends largely upon the kind of cows. Jerseys and Guernseys, by some people incorrectly called Alderneys, produce a rich milk, on which the cream rises quickly and completely; this is a decided advantage to those who wish to raise cream, but not if the milk is to be used whole. It may be a positive disadvantage, in some cases, to have the cream separate too soon. Durham and Ayrshire cows give milk of an average quality, from which the cream rises slowly, and on this account they are sometimes said to be good "milkman's cows." Holstein milk usually has a small proportion of fat or cream, but some families of these "black and whites" supply a product of excellent quality. The Holstein cows are noted for producing enormous quantities of milk.

Although these statements refer to pure-bred cows of the different breeds named, they also apply to grade animals having one-half or more of the blood of these breeds. All cows of the same breed do not give milk of the same quality; in fact, the composition of milk from cows of the same breed may vary as much as that from cows of different breeds. As a rule, however, similarly bred cows, under like conditions, give about the same quality of milk at corresponding times during the period of lactation. It is a popular notion that the feed given a cow influences the quality of her milk more than anything else; but if a cow in normal condition gives a rich milk at one period her milk will be of good quality at all times, unless she is badly neglected or diseased. Feed has a much greater influence upon the quantity of milk produced than upon its quality.

The first milk given after calving is called colostrum (Fig. 1, d). It contains a large proportion of albuminoids and is somewhat laxative. It is not fit for food, except for the newly born. In natural milk a small amount of albumen is present, but in colostrum the albumen often exceeds the amount of casein, and these two constituents may form over fifteen per cent of the milk. The percentage of sugar in colostrum is usually low; the fat is normal. The composition of colostrum changes rapidly, and within a few days after birth of the calf natural milk is given. After this the percentage of fat in the milk from any cow varies more or less from day to day, even if her feed, care and general treatment are always alike. The causes of the sudden changes are not always known; in fact, the fat often seems to increase or decrease without any cause. Sometimes the fat content changes over thirty per cent within twenty-four hours. As the period of lactation progresses there is a tendency to gradually increase in the total solids and the physical condition of the milk is so altered that cream rises less easily.

In well-regulated dairies each cow is milked about ten months of the year; the remainder of the year she is said to be "dry." When a dairyman takes the product of his herd to a cheese factory it is the custom to have all the cows giving milk in the summer time and none in the Winter, but when he supplies milk to customers he endeavors to have a small part of the herd dry at a time, so there will always be enough cows in milk to supply his trade. An incidental advantage of this is, the milk from fresh cows is added to that from those more advanced in the milking period and the changes due to the time of lactation are avoided in the mixed milk, which is thus kept of uniform quality.

DIFFICULTIES IN OBTAINING PURE MILK.

The first thing to be borne in mind is that milk is naturally a pure product. If any milk is found unclean, unwholesome, or disproportioned in its proper parts, the chances are that it is not the fault of the cow. In all such cases the presumption is that some person is to blame, either the one who cares for the cow or the one who handles the milk. If those who buy milk used proper care they would have little trouble in always procuring a good, clean article. It is possible to produce milk free from contamination, and if impure milk is delivered the dairyman or dealer may be held responsible, and it is the duty of the customer to reject it. When the milkman knows that his customers will not accept poor or unclean milk he will stop offering it.

On the other hand, some people are most unreasonable in their complaints and demands upon their milkmen. This, and the sharp competition between rival dealers, are two chief causes of dishonesty in the milk business. When a milk peddler knows that he is delivering the best of milk and complaint is made that it is not yellow enough or has not enough "body," and he is afraid of losing a good customer, he is naturally tempted to either give that person a supply from near the top of a can, thus depriving some one else of cream which rightly belongs to him, or to do what he thinks his dishonest competitor is doing, whatever that may be. There is a great desire to get milk cheap, and it is not an unknown thing for customers, including hotels and private institutions as well as private families, to demand such large measure for their money that the dealers feel compelled to "extend" the milk in order to meet these requirements and prevent loss of trade. Some are satisfied with the adulterated stuff, not knowing that the same amount of actual food, but no more and perhaps less, is being delivered in the large measure than was formerly delivered in the small one. This explains how it sometimes happens that milk is retailed in cities at less than the regular wholesale price. People too easily forget quality and think only of quantity. The only sensible thing for the housekeeper or other buyer of milk to do, is to willingly pay a fair price and insist upon good milk in return. Buyers should remember that at the highest prices usual anywhere, good milk is about as cheap an article of food as can be purchased.

It should also be borne in mind that milk can be contaminated as easily after delivery to the family or consumer as before, and too often a milkman is blamed for bad milk or cream when it was made so by conditions over which he had no control. If left where dust can settle in it or flies have access to it, or if set in an ill-ventilated cellar or in a warm place, it is pretty certain to be in bad condition after a few hours, no matter how good it was when delivered.

Numerous well-authenticated cases are known where customers have complained of milk received, and upon investigation it has been proved that servants in the house tampered with the milk, removing cream for their own use or adding old milk or vinegar to make it sour prematurely. The object of the latter act was, in connivance with an outsider who supplied the motive, to cause the buyer to change to some other dealer whom the servant was ready to recommend.

Attention on the part of consumers to the proper way of producing and handling milk would result in a great improvement in this most important food. Laws will do much to prevent fraud, but customers who know exactly what they want, how to get it, and how to care for it, have a much greater effect on milk producers and dealers than any possible laws.

CHANGES OF MILK.

Pure as milk may be in its natural state, it is a perishable product, and although with a proper knowledge of its peculiarities and care in its keeping it can be held in a wholesome state a reasonable length of time, there are natural changes which are sure to occur as soon as opportunity is given. Thunderstorms, impurities, warm temperature, and other conditions known to exist when milk is most liable to give trouble have been blamed for its changes. But it is now known that these are only indirect causes, and that the changes in milk which bother the housekeeper are due to, and cannot take place without, the presence of minute organisms called bacteria.

Any milk having a large amount of sediment is suspicious. Particles of dirt are a sign that germs are abundant. Thus dirty milk may be dangerous as well as disgusting. The dirt in milk consists mostly of particles of dead skin and manure, which fall into the pail from the body of the cow during milking; but dust in the stable, and dirt and dust in the vessels used for handling milk, and unclean attendants, are also common sources of dirty sediment in milk.

Milk from unhealthy or unthrifty cows or that which has been handled by sick persons is dangerous, as it may contain infectious germs or foreign substances which might affect the health of the consumer. The germs of typhoid fever, scarlet fever, diphtheria, and consumption (or tuberculosis) have been found in milk, and thus transmitted to man, and spread from family to family. Feverish cows, those having just given birth to a calf, and sometimes cows that have been milked a long time, produce milk which should not be used. Any milk having an unnatural appearance should be discarded.

Odors and peculiar flavors are due to bacterial action or to the volatile oils of some foods; onions, turnips, cabbage, and certain weeds, as garlic and wormwood, give characteristic odors and tastes to milk.

CARE OF MILK.

The proper care of milk after it has been delivered to the consumer is a matter of great importance. It is desirable to have it in the best condition possible for use, and it is not desirable to blame the milkman for things for which he is not in the least responsible. If milk is kept in an open vessel in a refrigerator with meats and various kinds of vegetables, it will absorb odors from them. It is also sensitive to flavors, and if allowed to stand in an old tin dish the "tin taste" can easily be recognized. Milk should therefore be kept in a cool place, free from odors, and in a perfectly clean vessel of suitable material. A well-glazed earthen or porcelain dish, or a glass jar or bottle, is the best container; tin is good so long as bright and the iron is well covered. Wooden dishes are objectionable.

As already stated, the change to which milk is most liable is simple souring, and the best agents to prevent this change are cold and heat. There should be no trouble in keeping milk sweet at a temperature of fifty degrees Fahrenheit from twenty-four to thirty-six hours after it is in the hands of the customer. But this can not be done unless it is delivered in good condition and properly handled after delivery. It is the custom in some places to leave the milk in dishes on the doorstep early in the morning, and it often remains there exposed to heat, dust, insects, and small animals until wanted in the house. This is a bad practice. In hot weather, milk exposed

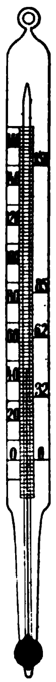


FIG. 8.—Dairy thermometer.

in this way for any length of time should soon sour, and if it does not it is probably due to the presence of preservatives. Too much care cannot be used in seeing that the milk is cold when delivered, and that it is then immediately put into a cool place. If allowed to stand in the warm air, even for a few minutes, the time it will keep sweet is shortened. Of course it will keep longer at a temperature between thirty-five degrees and fifty degrees Fahrenheit than above fifty degrees Fahrenheit.

Sometimes milk does not keep sweet when no cause can be discovered for its souring. This is frequently the case in Summer. Often the trouble is the refrigerator, which may seem cold on account of the great difference between its temperature and that outside, while it is in fact, not cold, and a thermometer may show its temperature to be even above sixty degrees Fahrenheit. A floating dairy thermometer (figure 3) is a convenient article to have in the house. It is a closed glass tube with a paper scale inside; it can be put into a fluid without injury, stands upright in the liquid, and is easily cleaned. The temperature of the milk should occasionally be taken when it is removed from the ice chest and the cause of early souring may be found.

PASTEURIZATION.

Pasteurization of milk is now being extensively practiced, and it is found to be an especially good means of preservation when it is difficult or too expensive to keep the milk at a sufficiently low temperature to prevent souring until wanted for use. A large proportion of the germs are killed by heat. When sufficient heat is used to kill all the germs the product is called sterilized milk, and may be kept in good condition indefinitely.

The advantages of pasteurized or sterilized milk are several, the most important being the destruction of some or all of the germs which may be present. For this reason alone it is thought advisable by some to use heat whenever the source of milk supply is not known, or when any epidemic is in the community, and some even recommend that all milk be boiled before it is used. If for any reason it is desired to keep milk longer than usual, as for a sea voyage, pasteurization will be a great help. There are some disadvantages in pasteurizing or sterilizing milk. If a sufficient degree of heat be used to kill all infectious germs a scum appears on the top, which is the albumen of the milk coagulated by heat; beside this, a boiled taste is acquired, which is objectionable to some persons, though very pleasant to others; and milk thus treated is found to be a little less digestible than raw or natural milk. If a high degree of heat be used the sugar is scorched and forms a brown deposit in the bottom of the vessel. An advantage of pasteurizing at home, if it is advisable to do this at all, is that one knows the quality of milk he gets, as it is easier to judge milk while fresh than when cooked.

The pasteurization of milk is an extremely easy operation, and if mothers better appreciated the dangers to which their little ones are exposed from the use of raw milk from unknown sources, especially in the summer time when it may be teeming with bacterial growth, more of them would use this simple precaution. It is estimated that one-third of all children die before they are three years old, and one of the leading causes of infant mortality is unwholesome milk. Bad milk cannot be made perfect by pasteurization, but the danger from its consumption can be lessened. The process is very simple and the necessary apparatus is inexpensive.

Briefly, the directions are as follows: One or more bottles nearly full of milk are plugged with dry absorbent or other clean cotton and placed in an upright position in a vessel having a false bottom and containing enough water to rise above the milk in the bottles (Fig. 4). The vessel is closed, placed on the stove and heated until the water is one hundred and fifty-five degrees F., if in Winter, or to one hundred and eighty degrees (or even to boiling if special precautions are deemed necessary) in Summer. It is then removed and kept tightly covered for half an hour. A heavy cloth over the pail will help to retain the heat. The milk bottles are then taken out, cooled as quickly as possible by cold water or ice, and kept in a cold place. Milk thus prepared may be expected to keep twenty-four hours, and should preferably be used within that time. The cotton plugs should be kept as dry as possible and should not be removed until the milk is to be used. A covered tin pail

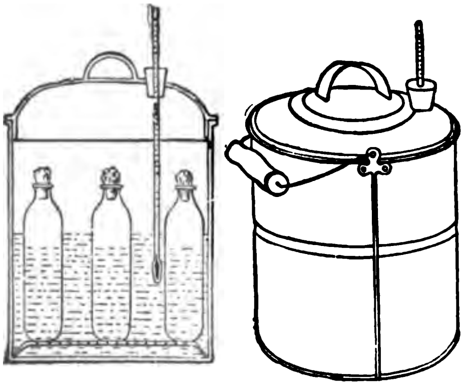


FIG. 4.—Pasteurizing apparatus.

answers well for the larger vessel. An inverted pie pan with perforated bottom can serve as the false bottom. A hole may be punched in the cover of the pail, a cork inserted, and a chemical thermometer put through the cork so that the bulb dips in the water, thus enabling one to watch the temperature closely without removing the cover, or an ordinary dairy thermometer may be used from time to time by removing the lid.

CREAM.

When it is desired to raise cream the milk should be put in a cold place, where it will not be disturbed, as soon as possible after it is received. A good quality of cream for table use can usually be obtained in this way (see Fig. 1, *c*). It will aid the cream in rising if the temperature of the milk is raised to about one hundred degrees Fahrenheit and then lowered by placing the dish in cold water. This cannot be done unless the milk is in good condition, as the high temperature may cause it to sour before it can cool sufficiently to prevent souring. Milk jars or bottles are now extensively used, and if they are filled when the milk is fresh, and carefully carried, the cream will begin to show in a few hours, and much less time is required for it to reach the top after it has been delivered than when it has been mixed just previous to delivery. Thus by the use of the jars considerable time is saved and fresher cream can be obtained. The jars may be purchased from any dairy supply company at a small cost, and provide a neat, clean way of handling milk.

Separator cream can be made much richer than "gravity" cream, and for this reason is preferred for whipping. It may be kept longer than that raised by gravity, as it can be taken from perfectly fresh milk, while the latter is usually twelve to twenty-four hours old when skimmed. Cream gradually becomes thicker the longer it is kept, and it is often held for this purpose. Sometimes it is one or two weeks old when used; very little is used in as fresh condition as milk. For this reason special care is needed to keep it sweet. Satisfactory results are not obtained by placing it in a refrigerator at a temperature of fifty degrees. It ought to be kept as near the freezing point as possible; it should be placed directly on the ice, or, better yet, be *entirely surrounded* with ice. Good efforts will be wasted if the ice comes up only half way and the top part is exposed to a warm temperature—it must be cold throughout. Skim milk and buttermilk should have the same care as whole milk.

DETECTING IMPURE MILK.

Some of the more common forms of impure milk have already been noted. By pure milk is meant the properly handled product of healthy, well-fed cows. To be legally regarded as pure, in some places, milk must contain at least a certain amount of fat and other solids. It is a difficult thing to determine by the appearance of milk whether it is pure or not, and even experienced dairymen are frequently unable to do this. It has a slightly yellowish-white color, a very slight odor, if any, and should have a distinctly sweet and pure taste. When allowed to stand quietly for several hours, cream should rise naturally, and if the separation is thoroughly effected the cream should form one-eighth to one-fifth of the total volume or bulk. No sediment should appear in the bottom of the jar or vessel. When good milk is poured from a tumbler it should cling to the glass a little, and not run off clean, like water. Skimmed or watered milk is thinner than whole milk, and of a lighter shade, being a bluish-white color. The yellow shade of milk is chiefly due to its fat, but as this constituent is more yellow in the milk of some cows than others, the yellowest milk is not necessarily the richest, and it is unsafe to judge by the color alone; poor milk from some cows may be more highly colored than rich milk from others. Besides this, artificial colors are sometimes added by dishonest persons.

When a volume of milk is to be tested, the first and most important thing to be done is to obtain a fair sample—one that will represent the whole and show its average composition. If the sample is taken from near the top or bottom of a vessel of milk which has been standing quietly for even a short time, it will be too rich or too poor in fat. The milk must be well and thoroughly mixed before the sample is taken. A good way of doing this is to pour it several times from one vessel to another. This should be continued until it is homogeneous and no lumps appear on the surface. If small particles of butter are floating about, a fair sample cannot be taken. There are several methods of testing milk. A complete analysis by a chemist will give the exact amount of each component part. This requires considerable time and expense, and is not necessary for practical purposes.

BABCOCK TEST.

Several methods of rapidly determining the fat content of milk with the aid of chemical reagents have been devised. One of the most accurate is the Babcock milk test.[1] The little machine constructed to apply this test, and of which several patterns are made, is in use in almost all well-conducted milk-receiving stations. It requires about a tablespoonful of milk for a sample, and the exact percentage of fat in it can be determined by this test in ten or fifteen minutes. The result is obtained by the action of centrifugal force combined with some chemical effects. The original cost of the machine is from three dollars to fifteen dollars, according to size and pattern, and a few cents' worth of materials are used at each operation. Its manipulation is easily learned, and it can be successfully operated by any careful person. A definite amount of the milk or cream to be tested is measured in a pipette and placed in a bottle which has a long, slender, graduated neck (Fig. 7); sulphuric acid is then added, and the bottle shaken until the mixture becomes dark colored, which requires but a few moments.

The bottle is then placed in the machine, by which it is rapidly revolved in a horizontal position with the neck toward the center. The fat is thus forced toward the neck by the other contents of the bottle, which are heavier and therefore thrown away from the center to the bottom of the bottle. Sufficient warm water is added to bring the fat up into the neck, where its exact percentage can be read on the scale. In the illustration a pipette for measuring the milk, the acid measure, and a test bottle are shown. From two to twenty-four bottles, containing as many different samples, can be tested at a time, according to the size of the machine. Special bottles of a modified form are furnished for testing skim milk and cream.

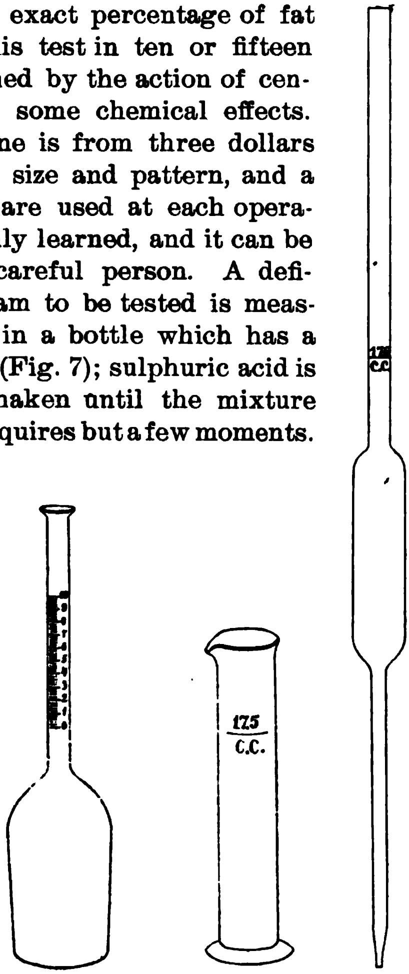


FIG. 7.—Glassware for the Babcock fat test.

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[1] Invented by Dr. S. M. Babcock, of the Wisconsin Agricultural Experiment Station, and is used by the Iowa State Dairy Commissioner.

Apparatus for this test is sold by dairy supply firms. A small machine, complete with the necessary glassware and acid, can be obtained for four dollars or five dollars. Full directions are sent with the apparatus. These can be easily followed and quite accurate results obtained after a little practice.

ACID TEST.

Acid commences to form as soon as milk is drawn from the cow, and after a certain amount has been developed it becomes evident to the taste and the milk is said to be sour. It is sometimes desirable to know whether milk is near the souring point or not, or if it is fresh enough for the use of a baby or delicate person; indeed, this may be a matter of considerable importance, and sometimes causes much uneasiness. It is well known that milk which is almost sour will coagulate on boiling, but this test does not show whether the amount of acid present is small or great. Prof. E. H. Farrington, of Wisconsin, has devised a simple method for determining the amount of acid. Tablets containing a definite quantity of alkaline material (such as caustic potash or soda) are dissolved in water and added to a measured amount of the milk to be tested. The tablets contain a little phenolphthalein, which is colorless when in acid solution and pink when in alkaline solution. A solution of these tablets is slowly added to the milk and the mixture is stirred until it becomes pink. It is then known that enough alkali has been added to neutralize the acid in the measured amount of milk and the amount of solution required indicates the acidity of the milk.

Perfectly fresh milk contains very little acid and would turn pink by the addition of a small amount of alkali, while milk nearly sour contains more acid and would require much more of the solution to turn it pink. The tablets are made of such strength that if a solution of two of them turns one ounce of milk pink, that milk should keep a certain length of time with proper care. If the milk remains white after the solution has been added to it, it will probably soon sour. This is a very simple, inexpensive, and useful test, and requires only milk enough to fill an ounce bottle. If this test were adopted for household use one could soon ascertain how much of the alkaline solution would be necessary to turn a definite amount of milk pink, at the time of delivery, and then refuse any not up to the standard.

It has been already stated that colostrum, or the first milk given after calving, contains a large percentage of albumen, and should not be used for ordinary purposes. Albumen is coagulated by heat, and when colostrum is boiled a large coagulum is formed. If perfectly sweet milk coagulates on boiling, the indications are that it contains too much albumen and it should not be used.

The tests referred to above are all good so far as they go, but none of them show whether the milk is from healthy cows or whether it has been contaminated by germs of disease. No test has been devised that will quickly and easily show the presence of disease germs in milk. It was stated above that bacteria get into the milk of healthy cows after it is drawn, and the best way to keep them out is to avoid, as much as possible, exposing the milk to them. This means that the dairy and its surroundings must be clean, and clean all the time. Filth can not be present in any degree without having a contaminating influence.

SELECTION OF DEALER.

Undoubtedly the best way to secure a good milk supply is to deal with a dairyman or milkman who is thoroughly honest and scrupulously clean.

On a well-conducted dairy farm one may expect to find these conditions:

A roomy, clean, dry, light, and well ventilated stable or cow house. To produce good milk, cows must be comfortable, and these conditions not only add to their comfort, but are absolutely necessary to keep them in the best of health.

Healthy and clean cows, which appear well fed and contented.

An abundance of pure water, to which cows are given access at least twice a day.

Feed of good quality; the grain and coarse fodder should be free from dirt, decay, or a musty condition.

A spirit of kindness toward the stock, exhibited by every one employed about them, and gentleness of the animals themselves.

Provision for washing and sterilizing or scalding all utensils which come in contact with milk.

Provision for straining, aërating, and cooling the milk in a clean atmosphere, free from all stable and other odors. This treatment should take place immediately after the milk is drawn from each cow.

Facilities for storing the milk and keeping it cold.

Especially great cleanliness in regard to everything connected with the dairy. The atmosphere of the stable should be pure and free from dust when milking is being done. Employés should carefully wipe the udders and wash their hands before milking, and should be in clean clothes. Whitewash is a good disinfectant, and should be seen in many more stables, and land plaster should be sprinkled about to absorb moisture and odors. The cow should stand on clean litter and not dirty stuff which could be used nowhere else.

If the milk is handled through a store in the city, the building should be kept scrupulously clean, and the room in which the milk is exposed to the atmosphere should be free from dust. There should be provision for keeping the milk cold when stored, and apparatus for steaming or scalding all utensils after they are washed.

CARE OF MILK ON THE FARM.

Whether milk is delivered promptly or held some time before delivery, it needs particular care, and the best dairymen provide for this purpose a room near the stable, but separated from it, so as to exclude dust and unpleasant odors. The milk is taken to the milk room as soon as a pail is filled, poured through a fine strainer, and run over a cooling aërator. This apparatus contains cold water, and the milk passes over the outside in a thin sheet. After twenty or forty quarts have been thus treated a shipping can is filled and set in cold water, or the milk is bottled and kept cold until needed. Some farmers do not use this care, but strain the milk directly into the large can, which stands in any convenient place, usually within the stable. When the can is filled it is placed (as soon as convenient) in a tub of cold water and stirred until partly cooled, then left with the cover ajar until wanted for delivery. Persons handling milk in this way do not appreciate how sensitive the fluid is to foul surroundings, and how quickly it will absorb injurious odors. It is fortunate for consumers that milk shows so plainly when it has been carelessly handled. If purchasers are sufficiently watchful they can avoid being supplied with milk which has been improperly cared for. The dairyman should always bear in mind that milk is a food, and he should not leave it unnecessarily in any place where he would be unwilling to have his own food left an equal length of time.

DELIVERY IN CITIES.

There are as many different ways of delivering milk as there are of producing it, and not an insignificant part of the trouble which it gives is caused by neglect to properly care for it while being delivered. The large wide-mouthed cans which are opened from fifty to a hundred times before they are emptied have their contents thus exposed to considerable dust and dirt. These cans are often carried without ice, even in the warmest weather, and milk cannot possibly remain long in good condition when so treated. An improvement over this method is to have a faucet near the bottom of the can and an arrangement to stir the contents, so that milk of uniform quality can be drawn without exposing the entire supply. In warm weather the cans should be covered with ice or ice water, or at least with a wet blanket, which is some protection.

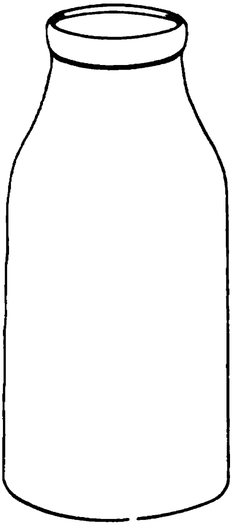
FIG 8.—Milk Jar.

The cleanest and most satisfactory way of delivering milk is in glass jars or bottles (Fig. 8). Every person who is served in this way should be certain that the jars are properly cleaned as soon as emptied, and the dealer should clean and sterilize them as soon as they are collected each day. Bottles are easily cleaned, each one is a measure and prevents over or under measuring, and each bottle of milk is known to contain all the cream belonging to it. Bottles do not hide dirt in the milk, and if they are filled with fresh milk and are allowed to stand quietly a few hours cream will usually show at the time of delivery. They save milk from being unnecessarily exposed, and if they are filled in the country the milk does not come in contact with city air until it is in the house of the consumer. This matter is of considerable importance, as it has been shown that bacteria are very abundant in the atmosphere of cities, while in clean country districts but few are found in the air. The use of sealed bottles decreases the opportunity for adulteration. Some companies serving a high-class trade with milk, for which special claims of purity are made, seal the jars, as soon as they are filled, with paper labels on which the time of milking is stamped, and these must be broken before the jar can be opened. A seal like the following is sometimes used:

M——— FARM MILK CO.
Mar. 3, 6 a. m.
Refuse a broken seal.

This is placed over the stopper and the two ends pasted or otherwise fastened to the sides of the jar. It is an excellent plan, and practically removes all chances of the milk being tampered with by driver or servant, and places all the responsibility on the one who bottles the milk; yet this is not effective unless the seal is so prepared and guarded as to prevent its being removed and replaced or counterfeited.

THE COMPOSITION AND INFECTIOUSNESS OF MILK.[*]

When I determined, upon the invitation of your Secretary, to present a paper at this meeting of the Association, I concluded that I would submit to you some observations upon "Animal Food," in general. However, as I began to investigate the subject, a field so wide, extensive and inviting opened up that I feared to enter, lest in roaming through the highways and byways, and reveling in its attractions and incidents, I should become prodigal of your time, and weary you with much speaking. Hence I have selected as the subject of my paper, "The Composition and Infectiousness of Milk," believing that this one item of animal food will afford an opportunity to present within reasonable time some facts, which, though not new to most of you, are worthy of being twice told. Indeed, the subject is of so much importance, and enters so much into our daily life, and is so universal in its application, that it cannot be too often nor too prominently brought before the public.

For the purposes of this article, cows' milk alone will be considered, since no other kind of milk is used by many infants and adults; and since it is the most universal, and, under proper conditions, the best substitute for human milk in the feeding of children.

Cows' milk, according to Cameron, is composed of the following parts per one million:

Water		870,000
Fat	40,000	
Casein	41,000	
Sugar	42,000	
Salts	6,200—	130,000
		1,000,000

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[*] By J. F. Kennedy, A. M , M. D. Read before the American Public Health Association at Buffalo, New York, September 15, 1896.

It also contains gases in solution in the following proportions, in thirty parts per one thousand in volume:

Oxygen	$1\frac{29}{100}$
Nitrogen	$12\frac{17}{100}$
Carbolic acid	$16\frac{54}{100}$

It will thus be seen that pure, uncontaminated cows' milk contains, in practically proper proportions, all the elements of a perfect food. Human milk, its closest analogue, is the only food prepared by nature for the most critical period of human life, and for nine to twelve months all the marvelous developments of infancy are best promoted by the sole use of breast milk.

In adults, milk alone will sustain life longer than any known food. Drs. Coplin and Bevan, in their excellent "Manual of Practical Hygiene," say: "The writers are aware of a patient who lived three years upon three to five pints of milk daily, and a patient in the hospital of the Jefferson Medical College, suffering from carcinoma of the gullet, received three pints of milk daily, and gained considerable weight and strength during the period of thirteen months."

The quantity of milk used in the United States annually, either in its original form, or its products, butter and cheese, is enormous, and attests its importance as an article of food. Especially is it important because of the large number of infants who are artificially fed, and whose sole dependence for life itself is upon milk.

It is said that during the year 1895, in England and Wales, one-fifth of the total deaths were children under one year old, and it has been shown that of this frightful mortality, much the greater proportion were artificially fed children.

In Berlin, in giving the certificates of death of children under one year, the fact must be stated as to whether the child was fed from the breast or brought up artificially. In ten thousand deaths thus reported, it was found that two-thirds, or seven thousand six hundred and forty-six, were artificially fed.

Hope, in a series of investigations in England, discovered that only three per cent of one thousand deaths occurred in infants that were breast-fed; and Minert, of Bavaria, found in a similar investigation, that out of four hundred deaths of children from summer diarrhœa that came under his notice, ninety-six per cent were fed artificially.

In view of these facts it is pertinent, therefore, to inquire whence come such direful results from the use of an article of food so well adapted by nature, in its normal condition, to the growth and development of the body?

The cause of quite a large number of deaths of these children artificially fed is inanition, the milk having been largely deprived of its nutritious properties by the addition of water—in many cases commercial milk being diluted from twenty-five to thirty per cent.

This dilution is not only a fraud upon the buyer, but a great crime perpetrated upon the innocent child, who needs the milk, with its rich per cent of butter-fat, as secreted by the udder, in order that it may grow and develop. If deprived of this essential element, instead of thus growing, the muscles become flaccid, the features haggard and pale, and finally literal starvation occurs.

Many States now have dairy laws which are intended to protect the people against this fraud of adulteration, and in some places the law is measurably successful. Even where there is a rigid and apparently efficient inspection of milk, however, and the butter-fat is up to the per cent prescribed, the inspection is not expected to reach further. The commercial, rather than the sanitary, interests of the consumer are guarded.

The design of this paper is to emphasize and intensify the importance of a sanitary inspection in addition to, if not to the exclusion of, the mere commercial examination. Indeed, a faithful sanitary inspection must of necessity exclude all adulterants, whether for the purpose of increasing the bulk, or changing the quality of the milk.

But little effort has yet been made to determine the condition of the cattle giving the milk, whether healthy and free from any infectious disease; to examine the feed and water given the cows; the sanitary condition of the stables; the character of the water used for washing the cans, if not for diluting the milk; the sanitary condition of the milkmen's family, and whether they have any infectious diseases; and the habits of those handling the milk, and the methods used in milking. All these are important conditions, which contribute greatly to the healthfulness or infectiousness of the milk.

The first thing of importance is to determine whether the animal furnishing the milk is healthy or not. If a corrupt fountain cannot send forth pure water, neither can a diseased cow secrete and furnish pure and wholesome milk.

An interesting report prepared by S. C. Busey, M. D., and G. M. Kober, M. D., of Washington, D. C., has recently been published by the Health Officer of the District of Columbia, for 1895, on "Morbific and Infectious Milk." The authors point out certain diseases of cows that affect the milk deleteriously, if not dangerously. Among those diseases which render the milk unfit for food, they cite the following affections: Garget and inflammatory condition of the udder and teats; gastro-enteric diseases; acute specific enteritis; puerperal and other septic fevers; foot and mouth disease; cowpox; anthrax; pleuro-pneumonia; rabies; tetanus, and tuberculosis.

They proceed in their report to furnish ample proof of the infectious character of milk from cows affected with the foregoing diseases, and show that often loathsome and fatal sickness has arisen because of the use of milk thus infected.

It is said that about one-seventh of all the deaths occurring in the world are from tuberculosis, and as it has been universally conceded that tuberculosis in man and cattle is identical, it is important to know to what extent this disease prevails among cattle.

It is fair to assume that it is much more frequent than is believed. Avarice and commercial greed combine to secrete and minify the prevalence of the disease, and to weaken or prevent belief in the infectiousness of the milk and meat of such animals.

Despite this disposition to conceal the extent to which this disease prevails, veterinarians and commissions are diligently and successfully turning on the search light of investigation, and already some interesting facts have been discovered.

Fleming says: "Tubercular phthisis, or tuberculosis, probably prevails among domesticated animals over the entire globe, though its frequency will depend upon various external influences, as well as the constitutional tendencies, of different species and breeds. In some countries it is enzootic and very destructive. In Mexico, for instance, it is very common, and causes much loss — about thirty-four per cent of the animals slaughtered for food being found affected."

In France, M. Arloing estimates that among the adult bovine animals five out of every one thousand are tuberculous. The proportion in England, according to Mr. Cope, is from one to twenty-six per cent, depending upon the locality.

In Belgium the estimate is four per cent.

In Holland, the proportion given varies from $8\frac{4}{10}$ to $10\frac{6}{10}$ per thousand.

Dr. Winchester reported to the Massachusetts Cattle Commission that during 1887 and 1888 he had learned of thirty-four herds of cattle in which tuberculosis was actually demonstrated by post-mortem examinations. These herds contained eight hundred and sixty-six cattle. Of these two hundred and forty-three, or twenty-eight per cent, were pronounced tuberculous, and upon being killed were found to be diseased. In fifteen other herds there were two hundred and forty-four head. Twenty-eight of these showed marked symptoms of tuberculosis, and twenty-four more were suspected. Post-mortems, however, were not obtained. Thus in these forty-nine herds, consisting in all of one thousand one hundred and ten animals, two hundred and seventy-one were reported as tuberculous and two hundred and thirteen as suspicious.

Later reports and more extensive examinations increase rather than diminish the per cent of tuberculous animals.

Dr. Harold C. Ernst, in his report to the Massachusetts Society for the Promotion of Agriculture, published in 1895, in which he tabulated the replies given to a series of questions, gives the following summary:

In the practice of thirty-nine veterinarians, representing seventeen States, most of them reporting for one year only, there occurred five hundred and forty-nine cases of tuberculosis and two hundred and forty-two suspicious cases, a total of seven hundred and forty-nine among one hundred and sixty-five herds, containing in round numbers three thousand animals. Thus, in the herds where tuberculosis existed, about eighteen per cent were diseased, and over eight per cent suspicious, a total of about twenty-six per cent.

It is proper to state here, that while tuberculosis is so prevalent and so widespread, the number of cattle affected with the other diseases named is comparatively small.

Having shown the extent to which tuberculosis exists, it is pertinent to inquire as to the danger of using milk from animals thus diseased. Nor is there an abundance of evidence wanting on this point.

Dr. Ernst, in obtaining data for his report above referred to, made an effort to obtain, so far as possible, clinical reports of cases of transmission of tuberculosis through milk from mother to offspring. In order to secure reports from the most reliable, as well as most probable sources of information, he addressed a letter to eighteen hundred physicians and veterinarians, selecting the former from the membership of the Massachusetts Medical Society of at least five years' standing, from the American Surgical Association, from the American Medical Association and from one or two other special societies of the country. The names of the latter were taken from the rolls of the United States Veterinary Association, and included those who were thought to have had enough experience to make their observations of possible value in this direction.

The direct question asked was: "Have you ever seen a case of tuberculosis which it seemed possible to you to trace to a milk supply as a cause?"

After receiving replies from the majority of those thus interrogated, he concludes his report as to the infectiousness of milk as follows:

"I. While the transmission of tuberculosis by milk is, probably, not the most important means by which the disease is propagated, it is something to be guarded against most carefully.

"II. The possibility of milk from tuberculous udders containing the infectious element is undeniable.

"III. With the evidence here presented it is equally undeniable that milk from diseased cows, with no appreciable lesion of the udder, may, and not infrequently does, contain the bacillus of the disease.

"IV. Therefore, all such milk should be condemned for food."

It is a well settled fact that milk in the udder of a healthy cow is normal and free from all micro-organisms, and that it is only after leaving the udder that these organisms make their appearance.

It has been an interesting question, and the occasion of careful and painstaking observation and experimentation, as to whether the milk as it comes from the udder of a tuberculous, or otherwise diseased cow, is so affected by her diseased condition as to produce the same or a similar disease in other animals (including the human) by using it; or whether the contraction of tuberculosis following the use of such milk is the result of the introduction of the tubercle bacillus during and after the process of milking.

The opportunities to determine this point must be rather few. So soon as the milk leaves the teat it is liable to infection in numerous ways, and even the calf receiving the milk directly into its mouth from the udder may get the infection from the external surface of the teat by germ-laden dust, or other adherent particles. Experiments that have been made in which all known or possible sources of infection were eliminated, seem to prove conclusively that the milk of a tuberculous cow, even before it leaves the udder, as well as the meat of the animal, is infectious in character, unsafe and unfit for food. This applies to cows in which there is no appreciable lesion of the udder, and is a refutation of the opinion so generally prevailing that only cows having tuberculous udders are capable of reproducing the bacillus in the milk.

At the Iowa Agricultural College Experiment Station, as a result of observations and experiments by Drs. Stalker and Niles, it was found that calves from healthy mothers that were at birth put with tuberculous animals to be raised, in a few months developed tuberculosis, while calves dropped from tuberculous animals and brought up by healthy cows showed no sign of the disease at all, grew well, were sleek, took on fat, and when killed later showed none of the characteristic lesions of tuberculosis, thus showing that so far as these experiments indicated, tuberculosis was not hereditary, and that the milk from tuberculous cows produced the disease in calves born of healthy animals.

Prof. James Law, in his very able paper on "Tuberculosis in Relation to Animal Industry and Public Health," dwells upon this point at considerable length. Coming from a source so eminent, his conclusions are entitled to and have received generous consideration and implicit confidence.

After considering the danger of the transmission of tuberculosis by the blood and meat of tuberculous animals, he proceeds to the consideration of the "danger from milk," and says:

"Milk is more to be dreaded than meat, because the udder is often the seat of tuberculosis, and the milk is usually taken uncooked. The danger is enhanced by the fact that this is often the necessary and only food of the infant and invalid, in which the germ is especially liable, through weak and imperfect digestion, to escape into the susceptible bowel.

"In milk, as in the case of meat, a strong and vigorous digestion does in some measure protect the consumer.

Peuch fed a two-months-old pig in five days four and one-half quarts of milk drawn from a tuberculous udder, and killed in fifty-six days, it proved quite sound. He inoculated four rabbits with the milk, and all four became tuberculous. Again, in the absence of tuberculosis in the udder, the milk may be little, if at all, infecting. Gerlach, who produced tuberculosis in calves, pigs and rabbits by feeding the milk, found no results from certain tuberculous cows, while others infected a large proportion. Nocard and McFadyean have been unable to infect rabbits, etc., with milk from an apparently sound udder of a tuberculous cow. The same has been my experience with milk from one cow in the last stages of chronic tuberculosis, and another having acute tuberculosis. Bollinger, Nocard and McFaydean claim that in the absence of tubercle in the udder the milk is not infecting. Whether true or not, as an ultimate fact this cannot be made a rule of action, as the following will show:

"Hirschberger inoculated rabbits in the abdominal cavity with the milk of twenty-nine tuberculous cows, of which the udders were or appeared sound, and produced tuberculosis fourteen times.

"Bang inoculated from sixty-three cows selected for their sound udders, and found the milk of nine of them infecting. A careful microscopic examination revealed tuberculosis in the udders of three of the cows, leaving six giving infecting milk, in which, even after death and with all scientific appliances, no tubercule could be found in the udder. This is $9\frac{1}{10}$ per cent, as tested by the microscope after death; it was $14\frac{28}{100}$ per cent, as tested by the able veterinary professor during the life of the cow.

"Ernst found ten cows in thirty-five with infecting milk, though the udders were sound. In one hundred and three animals inoculated, seventeen contracted tuberculosis, and of twelve calves sucking the cows, five became tuberculous.

"Drs. Smith and Kilbourne (Bureau of Animal Industry, Bulletin No. 3) found the milk infecting in three cows out of six with apparently sound udders. One infecting cow and one non-infecting one had each tubercle in the lymphatic gland behind the udder. Forty-four per cent of the inoculated guinea pigs contracted tuberculosis; one in five from one cow, eight in ten from another and six in six from a third.

"In my own experience, three calves from healthy parents sucking the apparently sound udders of three cows with general tuberculosis, all contracted the disease.

"It must be allowed that calves sucking the cows run extra risk of infection through their nurses licking them, and through feeding from a common trough, but there is the same danger for the ordinary milk consumer, since the cow in licking her udder is liable to leave baccilli to fall into the pail at the next milking.

"Again, the concentration of the bacillus in the undiluted milk of an infecting cow renders this much more dangerous than the milk of the same cow diluted with that of twenty, fifty or one hundred others.

"Bolinger and Gebhardt found that milk which infected all animals which took it pure was apparently harmless when diluted with fifty or one hundred times its volume of the milk of sound cows. As the bacillus can live in milk this apparent loss of virulence must be largely due to the reduction of the number of bacilli in a given measure of milk, and to their tendency to removal by adhering to the sides of the vessel during the mixing.

"Tuberculous expectoration, which is incomparably richer in bacilli, may be diluted with one thousand times its volume of water and yet remain infecting. But again, the glutinous saliva forms a protecting coating which strongly resists dilution.

"Instances of accidental tuberculosis of the human being through drinking the unsterilized milk are no longer wanting.

"In the practice of Dr. Amorback a well developed five-year-old boy, from sound parents, whose ancestors on both male and female sides were free from hereditary taint, succumbed after a few weeks' illness with acute miliary tuberculosis of the lungs and enormous enlarged mesenteric glands. A short time before the family had their family cow killed and found her the victim of advanced pulmonary tuberculosis. (Lydtin.)

"Dr. Demme records the case of four infants in the Child's Hospital at Berne, the issue of sound parents without any tuberculous ancestry, that died of intestinal and mesenteric tuberculosis, as the result of feeding on the unsterilized milk of tuberculous cows. These were the only cases in which he was able to exclude the possibility of other causes for the disease, but in those he was satisfied that the milk alone was to blame.

"After a lecture of the author's at Providence, R. I., a gentleman of North Hadley, Mass., a graduate of the Massachusetts Agricultural College, publicly stated that his only child, a strong, vigorous boy of one and one-half years, went to an uncle's for one week, and drank the milk of a cow which was shortly after condemned and killed in a state of generalized tuberculosis. In six weeks the child was noticeably falling off, and in three months he died, a mere skeleton, with tuberculosis of the abdomen. The father could trace no tuberculosis among his near ancestors, but the mother's father and uncle had both died of it. She remains in excellent health."

"Dr. E. O. Shakespeare (*Med. News*, March 26, 1892), attributes one-fifth of all deaths of infants and young children feeding on milk to tuberculosis, usually commencing in some part of the digestive organs."

In June, 1896, Drs. Sidney Martin and Gins Woodhead, and Professor McFadyean, of the Royal Commission of England, who were appointed to make special inquiries as to the effect of food derived from tuberculous animals, made their report. The report of Dr. Martin, who is exceedingly conservative, is of special value, because of the positive results he obtained with regard to the infectivity of milk from tuberculous cows. He says: "The milk from cows with tuberculosis of the udder possesses a virulence which can only be described as extraordinary."

He recommends as a practical measure that the milk from all cows in which one or more quarters of the udder are enlarged or nodulated, or in which the milk from one or more quarters fails either in quality or quantity, should be at once excluded, and the cows examined by an expert. He further declares that every tuberculous cow must be looked upon with suspicion, for, although the presence of tuberculosis of the internal organs, in his opinion, does not confer infectivity on the milk, yet tuberculosis may develop in the udder at any stage of the general disease.

Dr. Woodhead, by his experiments and observations, arrives at the conclusion that in children at least, general tuberculosis infection is in very many cases to be traced to the ingestion of infected milk—that is, it is not necessary that a local lesion of the alimentary canal should be produced. The tubercle bacillus may run the gauntlet of the lymphoid tissue of the intestines and pharynx to establish itself in the mesenteric or the cervical, and finally the tracheo-bronchial glands, from which, by a process of extension or secondary infection, tuberculosis of the peritoneum, the lungs, or a generalized tuberculosis, may ensue.

Prof. M. Stalker, of the veterinary department of Iowa Agricultural College, who has been making extensive investigations of this subject, reports two cases which came under his observation. One case was where five young people between the ages of twenty and thirty years, died of consumption in one family during a period of two years. No trace of the disease had ever been known in the family of either the father or mother of the victims. On the farm where the deaths occurred he found seventeen cases of tuberculosis in the herd of cattle, and others had died before the investigation was made.

Another case was in connection with a diseased herd of cows that was under test. A mother and child died; the mother from undoubted consumption, the child from intestinal trouble highly suggestive of the same disease. The cow that had supplied milk to the mother and child was tested and found to be tuberculous. Post-mortem examination of the cow revealed a badly tuberculous condition of the udder.

Enough has already been said to convince the most skeptical that there is great danger of infection from the use of milk from diseased animals, especially from tuberculosis.

Unfortunately the only infected and dangerous milk is not from tuberculous cows. It is well known that the best milk — milk from cows in which there is not a taint of disease, after leaving the cow becomes infected. It will be readily conceded that the most of the cases of disease arising from the use of infected milk, occur where the milk has been from healthy cows, and into which the pathogenic germs were introduced after leaving the cow. The extensive epidemics of infectious disease produced by the use of infected milk arise in this manner.

Drs. Busey and Kober, above referred to, in noticing some instances of milk that had acquired infective properties only after it had left the udder of the cow, say:

"Numerous instances have been observed in which outbreaks of typhoid fever, scarlet fever and diphtheria, by their sudden and explosive character, affecting families living in streets or localities, visited by the same milkman, naturally pointed to the milk supply as a common cause; but to Dr. Michael Taylor belongs the honor of being first to point out definitely that cows' milk might serve as a medium of spreading typhoid fever from a dairy where the disease prevailed. In 1867, Dr. Taylor also showed that scarlet fever might be distributed in the same way. In 1877, Mr. Jacob traced a diphtheria epidemic at Sutton to milk supply, and in 1872 Macnamera traced an epidemic of cholera at Calcutta to an infected dairy."

These facts could not fail to invite criticism and sharpen the power of observation in others, and in consequence similar outbreaks were more frequently reported, so that Mr. Ernest Hart in a most valuable paper was enabled to present to the International Medical Congress, held in London, 1881, the history of fifty outbreaks of typhoid fever, fifteen of scarlet fever and seven of diphtheria, all traceable to the milk supply; but even this formidable display of facts was not accepted as conclusive, largely because the milk industry constitutes a strong spoke in the commercial wheel, and naturally opposed what they considered meddlesome interference with their trade, and in many instances were upheld by members of our profession, who considered the evidence wholly circumstantial and incomplete as long as the specific germ of the respective diseases had not been demonstated in the suspected milk. * * * An approach in this direction worthy of emulation has been made by Professor Vaughan before the Congresss of Demography, in London, August, 1891, when he declared:

"Milk has been frequently diluted with water containing germs of typhoid fever, and the prevalence of the disease may mark the daily rounds of the milkman. I have here a culture tube containing a bacillus which I found simultaneously in the water from the dairy well, and in the milk from the cans. At the same time one or more cases of typhoid fever existed in every family which patronized this milkman. The bacillus resembles, but is not identical with, that of Eberth."

They further, in their report of epidemics of typhoid fever, scarlet fever and diphtheria, say:

"Mr. E. Hart tabulated fifty epidemics of typhoid fever, and we have collected eighty-eight, making a total of one hundred and thirty-eight epidemics traceable to a specific pollution of the milk, the main facts of which are presented in a subjoined table. In one hundred and nine instances there is evidence of the disease having prevailed at the farm or dairy. In fifty-four epidemics the poison reached the milk by soakage of the germs into the well water with which the utensils were washed, and in fourteen of these instances the intentional dilution with polluted water is admitted. In six instances the infection is attributed to the cows drinking or wading in sewerage-polluted water. In three instances the infection was spread in ice cream prepared in infected premises. In twenty-one instances the dairy employés also acted as nurses. In six instances the patients, while suffering from a mild attack of enteric fever, or during the first week or ten days of their illness, continued at work, and those of us who are familiar with the personal habits of the average dairy boy will have no difficulty in surmising the manner of direct digital infection. In one instance the milk tins were washed with the same dishcloth used among fever patients. In this instance the disease was attributed to an abscess of the udder (?), in another to teat eruption (?), and in still another to a febrile disorder (?) in the cows. In four instances the disease was spread through the medium of creameries, and in one instance the milk had been kept in the sick room.

"Mr. Hart collected statistics of fifteen epidemics of milk scarlet fever, and we have tabulated fifty-nine, making a total of seventy-four epidemics spread through the medium of milk supply (?).

"In forty-one instances the disease prevailed either at the milk farm or dairy. In six instances persons connected with the dairy either lodged in or had visited infected houses. In another instance the milkman had taken his can into an infected house. In twenty instances the infection was attributed to disease among the milch cows; in four of these the puerperal condition of the animal is blamed. In nine instances disease of the udder or teats was found. In one instance the veterinarian diagnosed a case of bovine tuberculosis. In six instances there was loss of hair and casting of the skin of the animal. In another instance the cattle were found to be suffering more or less from febrile disturbance. In ten instances the infection was conveyed by persons connected with the milk business, while suffering or recovering from an attack of the disease, and in at least eight cases by persons who acted as nurses. In three instances the milk had been kept in the cottage close to the sick room. In another instance the cows were milked into an open tin can, which was carried across an open yard past an infected house; and in another instance, the milkman had wiped his cans with white flannel cloths (presumably infected), which had been left in his barn by a peddler. Two epidemics appear to have been instances of mixed infection of scarlet fever and diphtheria.

"He also collected statistics of seven epidemics of milk diphtheria, and we have added twenty-one more. In ten of these twenty-eight instances, diphtheria existed at the farm or dairy, and in ten instances the disease is attributed directly to the cows having garget, chapped and ulcerative affections of the teats and udder, while in one instance the cows were apparently healthy, but the calves had diarrhœa. In another instance one of the dairy maids suffered from a sore throat of an erysipelatous character; in another the patient continued to milk while suffering from diphtheria; and in still another, one of the drivers of the dairy wagons was suffering from a sore throat.

"It is interesting to note that of one hundred and thirty-eight epidemics of milk typhoid, seventy-four of scarlet fever and twenty-eight of diphtheria, a total of two hundred and forty epidemics, one hundred and eighty-seven have been recorded by English authors, thirty-one by American, and nine by Scandinavian; eight came from Germany, three from Australia, and one each from French and Swiss sources.

"Whether this is due to the fact that on the continent of Europe milk is rarely used in a raw state, or whether it is simply an index of the greater interest taken in England and the United States in preventive medicine, remains to be determined."

Three or four instances of epidemics of typhoid fever occurring in this country from the use of infected milk will be given somewhat in detail, in order not only to demonstrate that such outbreaks do occur, but to also illustrate the necessity for and the success attainable by intelligent and faithful investigation.

In June, 1890, the Connecticut State Board of Health was requested to investigate an outbreak of typhoid fever at Waterbury. Attention was first directed to the water supply and drainage, which were found not to be the cause. There were thirty-five house invasions, with fifty cases. Of these, twenty-six houses, with forty-one cases, it was discovered, were supplied with milk from the same milkman; that this milkman secured his milk from several farms; that the invasion followed the route of milk from a certain one of these farms. An investigation was made at this farm, and it was found that the farmer, his daughter and a farm hand had been sick with typhoid fever.

The excreta of the sick were thrown upon the barnyard; the hired man defecated, so long as able to be about, in the cow stables. The barnyard was in a bad condition. The milk was handled in a shed attached to the barn. In fair weather the milk cans were washed outside the shed; on rainy days, inside the shed. A door opened from the shed into the cow stables on one side, and another door into the barnyard. In the yard was a tank in which the milk cans were placed to cool. The can lids were tilted so as to admit the air. There could be no question as to the source of the infection of the milk. The water used was from a spring, and free from the typhoid bacillus. The material of the barnyard was infected, and the conditions were favorable for extensive multiplication. It was tracked into the milk room by the men, and there drying into dust, was carried by air currents into the milk.

Among the cases in this invasion was one of a person who did not use the milk. But it was found that two weeks prior, ice cream had been eaten, and that the milk came from the infected farm, thus confirming the work of Pruden and others, that typhoid bacilli retain their vitality for months frozen in blocks of ice. The milk supply from this farm was stopped, and the disease subsided.

In August, 1892, an epidemic of typhoid fever appeared in a particular portion of the city of Springfield, Mass., a detailed account of which is given in the report of the State Board of Health. The people, as well as the physicians, were perplexed, and various theories were put forth as to the source of infection, for it was in the best part of the city, where the environments apparently precluded the usually accepted sources. First, the water of certain wells was suspected, but investigation showed that most of the infected families used water from the city waterworks, which was uncontaminated. The drainage was suspected, but it was shown that the houses were mostly new and the plumbing good. The sewer was suspected, but families living nearest the manholes of the sewers were unaffected. The cemetery was also suspected, but it was found that a well in the cemetery contained less ammonia than wells in the typhoid district, where the disease was most prevalent. The theory of ice infection was also tested and exploded. It was finally discovered that all the infected families were supplied with milk from one man; that in the most infected portion one family was exempt entirely from the disease, and this family received milk from another milkman.

On investigation of the farm of the milkman, it was found that early in the Spring the milkman's daughter was sick with so-called "bilious typhoid fever." Others of the family were also sick with a "slow fever." The excreta of the patients were thrown into a privy vault, and the contents of the vault were subsequently thrown upon a tobacco field. Near by was a well not used for drinking purposes. Into this well the milkman lowered his cans of milk, letting them sink to the bottom, to remain until they were taken away to supply his route. In the well was an old chain pump. Over the well were loose planks. The men in wet weather tramped over the tobacco field, through the cow yards and then to the well. The planks over the well were filthy with mud, and careless pumping washed the mud and filth into it. The water was dirty, and was found to contain *baccilli coli communis* to an enormous extent. Nine milk cans were lifted from the well. They were stopped with wooden stoppers. On tipping the cans milk ran out around the stoppers. This being true, the water of the well would run in None of the cans were full. The facts, as developed in this investigation, left no room for doubt or question as to the source of the epidemic, wherein there were one hundred and fifty cases, with twenty-five deaths. Of the one hundred and fifty cases, one hundred and one had milk from the same man, and one hundred and thirty-five had access to the same milk.

In October, 1894, the Secretary of the Board of Health of Titusville, Pa., found three cases of typhoid fever on a farm. From this farm milk was taken to the city. Within four weeks there were fifty cases of typhoid fever, all in families who had been using milk from this farm. The first case on the dairy farm was brought from this city, Buffalo. The mother took care of the sick and the milk at the same time.

In April, 1895, a serious outbreak of typhoid fever occurred in the city of Stamford, Conn. It was so sudden and widespread that Dr. Lindsley, Secretary of the State Board of Health, was called to make an investigation as to the cause and to assist in suppressing it. He reports that attention was first given to the water supply, but that was soon abandoned. So, also the food supply. It was soon discovered that sickness followed exactly the route of a certain milkman. In various parts of the city there were three hundred and eighty-six cases, of which three hundred and seventy-six were persons who used milk from this milkman; while in houses contiguous, where milk from another source was used, there were no cases. There were twenty-five deaths. The appearance of the disease was simultaneous over the district. So soon as the source of infection was discovered the milk supply from this man was stopped, and the disease at once subsided. Investigation of the premises of the milkman revealed the fact that he washed his milk cans with water from a well which chemically showed contamination by sewage. Pruden discovered six thousand six hundred and ninety living bacteria in a single cubic centimeter of the water.

The water in the well was only one foot and nine inches below the surface, and overflowed in the Spring, and surface drainage was toward the well. A shallow privy vault, leaking at the surface, was twenty-five feet distant, and free of access to a walking case of typhoid fever. The conclusion was irresistible that the source of this outbreak was milk, and the source of infection of the milk was the water from this well, contaminated by drainage from this privy.

The foregoing is sufficient to establish the fact that milk from infectious animals, especially from tuberculous animals, and that also from healthy animals when infected by disease germs, is dangerous, and leads to a very brief consideration of the sources of infection and the remedy.

It is not necessary, as it would not be profitable, were it possible to note in detail all the physiological or pathological processes by which the milk of a tuberculous cow is changed in the udder from a healthful and nutritious product into one carrying disease and death to those who use it. We only know that such has been demonstrated to be the fact.

I have pointed out, in the instances above given, some of the methods by which milk, after it leaves the udder, becomes infectious.

While milk in the healthy cow's udder is free from bacteria, it is well known that the milk of commerce, especially as found in the cities, is swarming with these micro-organisms.

Fortunately few of these bacteria are harmful, and many are useful, if not essential.

While, therefore, milk is favorable to the growth and development of so many harmless germs, it is also favorable for the propagation of pathogenic germs.

The following are some of the methods by which these germs, beneficent and malevolent, gain access to the milk outside of the udder:

1. By the process of milking itself. Particles of dirt from the hands of the milker, from the teats and udder, and from the sides of the cow fall into the pail. The pail itself may have been washed with impure water, and been imperfectly dried; or the germs may have been floating in the air and settled in the bucket before, during or after the milking.

2. The stables may have been in a filthy condition, and the cows lying in the filth and having it adherent to their udders, drop it into the pail.

3. The hands of the milker are often moistened with the milk to contribute greater ease and facility to the process of milking, and the drops of the milk thus used and laden with impurities, if not with filth, get into the milk.

4. Then, it often happens in many ways that the milk after it leaves the dairy is infected by the addition of water, or by varying changes of temperature, especially a higher temperature, which greatly favors the rapid multiplication of the bacteria.

5. Even if the milk has reached the consumer in good condition, it may become infected because of the filthy or careless habits of the inmates, or by the presence of infectious diseases in the family.

6. It has been found in several instances that milk was infected in the dairy because of sickness in the home of the proprietor or some of the milkmen.

Is it any wonder, then, that milk should be rendered infectious? Is it not rather a miracle that the mortality from its use is not greatly multiplied? The only remedy is suggested by the causes above enumerated, and may be summed up under three heads—inspection, cleanliness and sterilization.

All dairy cattle should be carefully inspected by a competent veterinarian, with a view to determining the presence of tuberculosis, and all diseased or suspected animals should be condemned. The habits of dairymen, with respect to cleanliness, the barns, the water supply, should all be known and recorded.

The sale of milk from dairies or private families where infectious diseases exist should be prohibited.

The strictest cleanliness of animals, persons and surroundings should be enjoined and enforced; and the almost certainty of infection from the lack of cleanliness, as well as the terrible results so often following the use of milk so infected, should be taught in every home and school.

But with all this teaching and the most rigid inspection there will be vast quantities of dangerous milk sold and used, and sickness and death ensue in consequence, unless those receiving the milk resort to sterilization.

To "sterilize" milk the temperature should be raised to the boiling point, and kept there for a few minutes. It has been suggested that a few spores will at this temperature perhaps not be destroyed, and their presence will sooner or later cause the milk to sour; hence the milk should be subjected to two hundred and twenty degrees heat.

Both Pasteurization and the raising of the temperature to two hundred and twenty degrees require the use of a thermometer—an instrument that is kept in comparatively few homes, and when kept is far from being reliable. Hence I recommend as the best, because the simplest and most reliable method, the boiling of the milk. The best way is to place the milk in bottles tightly corked, and boil them while immersed in water. The bottles should only be filled within about two inches from the cork, so as to allow for the expansion of the milk. After boiling, the bottles should be left in the water until it is cool, as their removal while hot will break the bottles. With this process that can be practiced in any home and by anybody who can tell when water is boiling, there will be absolutely no danger from disease germs, and milk may be kept for some days, especially in a cool place, without becoming sour or altered in any way.

Milk in larger quantities may be sterilized by being placed in tightly covered pails or cans, and boiled in a kettle or boiler containing water.

Professor Jacobi, of New York, one of the highest authorities we have on infant feeding, etc., says: "Virtually sterilization" (by boiling) "has been practiced by me more than forty years, and has been taught by me these thirty-five years, both in lectures and in books and essays. I have always urged that safety increased with the number of boilings."

"There are many expensive and ingenious contrivances for sterilizing milk, but I believe the above simple methods are not only practical and economical, but reliable."

From the standpoint of public sanitation, therefore, the production, handling, and sale of milk should be regulated and controlled by the health authorities. The intervention of the present State law is only commercial. It has no relation to the public health. This intervention should begin at the dairy and continue until the consumer is reached; for, while the dairy farm is the chief source of infection, various other places for the reception and distribution of milk are also dangerous. This intervention can best be provided by a system of inspection and license, and all milk from unlicensed producers and vendors should be prohibited from sale or distribution within the limits of a city or town.

It is with pleasure the opportunity, here presented, is embraced to commend in the highest terms, the efficient effort of the State Dairy Commissioner to elevate and improve not only the dairy herds and creamery products of the State, but the milk supply of cities and towns as well. As to the latter, he has been an earnest, indefatigable co-worker with the State Board.

FLOUR--WHITE VS. DARK.

There is an ever increasing interest among writers and experimenters respecting the comparative food value of white flour and brown flour. For an intelligent conclusion as to this value it is necessary to know the constituent parts of wheat.

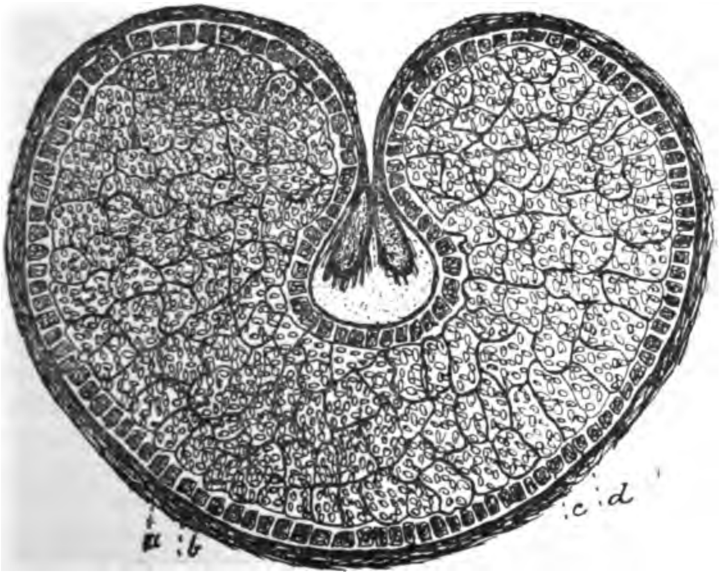

FIG 1 —Wheat grain highly magnified.

WHEAT—WHAT IT IS.*

This grain contains in its natural state all the proximate principles that enter into the composition of the body, or rather the proximate principles of the two are so similar (some being identical) that they are easily appropriated by digestion and assimilation to the body's nutrition.

CHEMICAL ANALYSIS.

The following is a fair average analysis of good whole wheat:

Starch	$57\frac{00}{100}$	Fibrin	$9\frac{27}{100}$
Dextrine	$4\frac{50}{100}$	Oil	$1\frac{80}{100}$
Nitrogenous subst'nces, soluble in alcohol, but insoluble in water	$0\frac{42}{100}$	Woody fiber	$6\frac{10}{100}$
Coagulable albumen	$0\frac{26}{100}$	Extractive matter	$1\frac{40}{100}$
Albumen, soluble in water and not coagulable, two kinds	$1\frac{55}{100}$	Ash	$1\frac{70}{100}$
		Water	$16\frac{00}{100}$
			100

ASH.

Potassa	$30\frac{00}{100}$	Chloride of sodium	$0\frac{55}{100}$
Soda	$3\frac{50}{100}$	Sulphuric acid	$0\frac{50}{100}$
Magnesia	$11\frac{00}{100}$	Silica	$3\frac{50}{100}$
Lime	$3\frac{50}{100}$	Phosphoric acid	$46\frac{80}{100}$
Oxide of iron	$1\frac{00}{100}$		
			100

MORPHOLOGY.

Grains, or kernels of wheat vary from each other slightly in form, according to their variety, but in general, they are oblong oval, having a deep groove extending from end to end on one side. At one end is the brush of vegetable hairs; at the opposite extremity under an irregularly curved surface layer of bran, technically called the shield, is the *embryo*.

Fig. 2, A B, shows both sides of the grain, magnified six hundred diameters. C represents the grain the natural size.

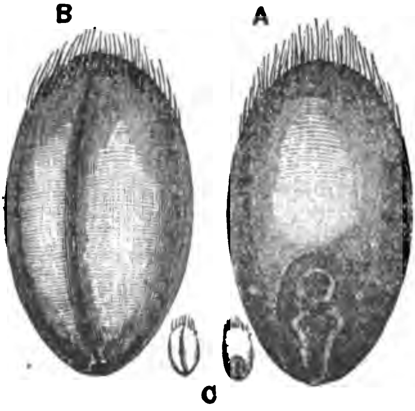

Fig 2.

If we make a transverse section of a grain midway between both ends, as shown in Figs. 1 and 3, it will be seen that it consists of an envelope, brown in color, enclosing a white, softer kernel. The envelope is known as the bran, and the inner portion as the endosperm, or gluten. Within the latter lies the embryo, or germ. Chemically, the bran of the grain is found to be richer in nitrogenous matter

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*A. T. Ouzner, M. D., in *Alkaloidal Clinic*. June, 1897.

and salts than the endosperm. The germ also contains more proteid material and phosphates than the endosperm.

Fig. 4 represents the different coats of a grain of wheat peeled up and turned back. The first three coats constitute the true bran, which is nearly destitute of nutritious properties. It consists mainly of woody fiber and cellular tissue, holding nutritive salts, these constituting its whole nutritive value. Beside this, it is very irritating to the digestive organs. It absorbs water readily, and if moistened, and left in a mass it speedily ferments and decomposes.

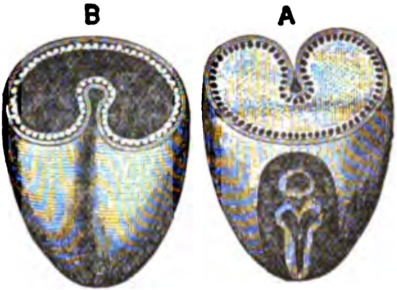

Fig. 3.

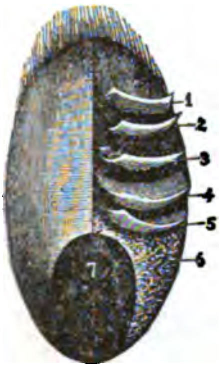

Fig. 4.

The coats 4 and 5 are mainly composed of cellular tissue and like the bran-coat contain nutritive salts; but unlike the bran, they are not irritating.

At 6 we have the gluten sacs and perisperms, and at 7 the embryo, which play an important part in the economy of nutrition.

GLUTEN.

The comparative baking qualities of different samples of wheat flour may be judged by the height to which in similar vessels the gluten of equal weights of flour is observed to rise. This quality is due, not to the crude gluten as a whole, but to that substance called glutine, or vegetable fibrin. Other cereals contain but a small percentage of it, their crude gluten being made up mainly of vegetable albumen and casein.

From one hundred pounds of "Pillsbury's Best" flour may be obtained thirteen and one-half pounds of very fine gluten. From Franklin Mills flour of the entire wheat, the writer has obtained fifteen pounds of gluten from one hundred pounds of flour.

A noticeable property possessed by gluten is its power of absorbing water. Ordinary flour of commerce will take up in bread-making one-half its weight in water. The inner mass of the grain, constituting seventy-five per cent of the whole grain, consists of starch, gluten, albumen, sugar and gum. Of these ingredients fully ninety per cent is starch.

STARCH.

If we regard the enormous proportion in which the seeds of cereals and luguminous plants, and the different tubers, enter into our dietary it is not exaggerating to say that fully two-thirds of the food of mankind consists of starch. Starch, like sugar, is a carbo-hydrate, $C_{12} H_{20} O_{16}$.

Starch in a raw state is to man an almost indigestible substance; but when subjected to the operation of cooking it is readily digested. The digestion of starch in the human subject is accomplished by the saliva and pancreatic juice, which are rich in a substance called diastase, and to which they owe their power.

In the human infant diastase does not appear to exist in sufficient abundance to digest starchy substances until about the seventh month. Foods containing starch largely are unsuitable to young infants.

From examination we find that wheat as a food is most valuable, containing, as it does, all the proximate principles that enter into the composition of the human body.

This being conceded, it follows that if we can retain in the food manufactured from it these principles in a proper proportion, we shall have a perfect food for the ordinary wants of the body.

The Roman soldier as he marched, carrying his supply of whole wheat, was enabled to conquer the world. Fashion has decreed that flour shall be white.

White flour means little gluten and still less phosphates proportionately.

In this age of mental activity the call is for phosphorus.

Whence shall we obtain the proper supply?

Shall we call upon the pharmacists for some of their excellent preparations, or had we better use the natural supply found in the whole grain of wheat?

It takes two hundred and seventy pounds of wheat to make a barrel of flour by the ordinary milling process. We have (or should have) a loss of but thirteen and one-half pounds, whereas the actual loss amounts to between fifty and sixty pounds.

Of what does this loss consist—what elements of the grain are thus needlessly wasted?

They are the gluten and phosphorus.

FINE WHITE BREAD.

John Goodfellow, F. R. M. S., lecturer on physiology and hygiene at the Bow and Bromley Institute, London, member of the Society of Hygiene of France, author of "Bread is the Staff of Life," "Personal and Home Hygiene," honorable consulting chemist to the Master Bakers' Society, etc., has recently written a very complete and exhaustive book upon "The Dietetic Value of Bread." He writes strongly in favor of "*fine* whole meal bread." He denounces the ordinary brown bread, "coarse" whole meal bread and the "ordinary" whole meal bread. He says:

"Fine white flour is obtained from the central portion of the grain, *very finely ground.*

Whole-meal flour is obtained from the entire grain.

The chief difference between these kinds of flour lies in the amount of nitrogenous matter and salts which each contains. As we pass from fine flour to whole-meal flour, the percentage of nitrogenous material and mineral matter increases.

Fine white flour is poor in proteids, fat, and mineral matter; while the carbo-hydrates greatly preponderate.

Fine white bread is not a perfect food for the following reasons:

1. It is deficient in proteids.
2. It is deficient in fat.
3. It contains too much carbo-hydrate matter.

White bread is particularly deficient in calcium phosphate, which plays such an important part in the formation of new tissue, the outer portion of the wheat grain not being used. It is therefore less able to support life.

White bread is also deficient in iron, so that those who are anæmic should not partake largely of it.

Those who partake of white bread should take care to supplement it largely with other foods, richer in lime.

On no account should it form part of the diet of children or infants, unless supplemented by milk or other foods rich in lime and phosphates, for they require especially phosphate of calcium to form their bones and teeth, and to promote the growth of new tissue.

A very serious objection to the use of bread for infants is the fact that it contains *starch.* The diastasic ferments are not developed in early infancy, therefore starch is totally unsuited for ingestion into the alimentary canal. Many infants are hurried into an early grave by the serious derangements set up in the intestines by the irritating action of the insoluble starch on the delicate mucous membrane which lines the alimentary canal.

Bread may be given to children above ten months, as the diastasic ferments of saliva and pancreatic juice have then sufficient power to act on the starch.

There can be no doubt that white bread is very easily and thoroughly digested—more digestible if made with yeast than if chemicals are used—and thus is of the utmost value as a food when the deficiency of proteids and salts is made up by other foods.

WHOLE-MEAL.

Whole-meal is obtained by reducing the entire grain, so that the outer layers that are richest in albuminoids and phosphates, and which yield the bran, are retained in the flour.

An analysis reveals the fact that whole-meal is richer in these food substances than fine white flour, to-wit:

	FLOUR.	WHOLE-MEAL.
Water	12	14
Proteids	$9\frac{3}{10}$	$14\frac{9}{10}$
Carbo-hydrates	$76\frac{5}{10}$	$66\frac{2}{10}$
Fat	$\frac{8}{10}$	$1\frac{6}{10}$
Fibre	$\frac{7}{10}$	$1\frac{6}{10}$
Mineral matter	$\frac{7}{10}$	$1\frac{7}{10}$
	100	100

An analysis does not always indicate the dietetic value of a food. The value of whole-meal depends on its fineness. Bread made from *ordinary* whole-meal is not always a desirable food. Ordinary methods of grinding do not reduce the hard envelope of the wheat grain to very fine particles, and no whole-meal is satisfactory unless the bran is very finely divided. The finer the bran particles, the more thoroughly whole-meal bread is assimilated.

WHOLE-MEAL BREAD.

Whole-meal bread varies in composition according to the wheat from which it is made. The following represents a fair average sample of whole-meal bread, and pure white bread:

	WHOLE-MEAL.	WHITE.
Water	40	37
Proteids	$12\frac{2}{10}$	$7\frac{5}{10}$
Carbo-hydrates (starch, etc.)	$43\frac{5}{10}$	$53\frac{8}{10}$
Fat	$1\frac{2}{10}$	$\frac{8}{10}$
Fiber	$1\frac{8}{10}$	.....
Mineral matter	$1\frac{3}{10}$	$\frac{9}{10}$
	100	100

Compared with white bread it will be seen that the ratio of nitrogenous bodies is much higher; the carbo-hydrates much lower, and slightly more fat and mineral matter.

On the supposition that ordinary whole-meal bread is digested to the same extent as white bread, it would approximate very closely to a perfect food as regards nitrogenous ratio, but experiments have proven that it contains far more waste material than white bread, that about twelve and one-half per cent of it is excreted undigested from the alimentary canal in the form of woody fiber, cellulose, salts, proteid material, and fat. The waste of white bread is only three and eight-tenths per cent.

Ordinary whole-meal bread, then is not a perfect food for the following reasons:

1. It yields too little proteid to the body.
2. It yields a surplus of carbo-hydrate material.
3. It is deficient in fat.
4. It is deficient in mineral matter.

If all its proteid material were digested in the body it would be an ideal food. The only method to secure this result is to make the bran much finer, for the finer the bran the more thoroughly the whole-meal bread is assimilated. Coarse whole-meal bread is more nearly a perfect diet for adults than for children.

Fine whole-meal bread is better for children than white bread.

"Enumerating, it may be said, ordinary whole-meal bread is unsuitable for children because:

"(1.) It iritates unduly the intestinal tract.

"(2.) It increases the waste of other foods.

"(3.) It may produce diarrhœa.

"(4.) It yields a less quantity of nutriment, both organic and inorganic, to the body than *white* bread."

In the Iowa Monthly Health BULLETIN for August, 1896, a talented and very close observer writes over the signature of "Soliped" as follows:

FINE WHITE WHEAT FLOUR VS. COMMON SENSE.

It has come to be known that the patent flour processes of the day are really sacrificing nutrition to appearances and to greed. They produce beautiful fine white flour, to be sure, but to that end, measurably eliminate its food value. Many brands of this new process flour are milled so very fine that they have a velvety feel, like corn starch for example, when rubbed between the finger and thumb. These are the most objectionable, even though the most saleable specimens, but then, the quantity of flour extracted from the grain is greater, the miller's profit is increased and the flour made whiter and finer to the special delectation of simple souls, who do not realize that the nutritiousness of the product is in inverse proportion to its bulk and elegance and that it is incapable of yielding the "Bread which strengtheneth man's heart"—the "stay and the staff, the whole stay of bread," or, in other phrase, "the *staff* of life." In these closely dressed flours—as Pavy observes—"the starch granule becomes bruised and damaged and is found to be deteriorated for the purpose of bread-making." It is well known that experienced bakers prefer to use a flour which feels a little gritty when rubbed between the thumb and finger, so, also, do good housewives. The housewife and the baker both know that such flour makes wholesomer bread—"a bread with more *body* in it," as one woman said to me the other day—but neither knows the reason why. That reason is found in the fact that in the coarser flour a larger proportion of the phosphates—the bone and muscle builders— is always present, and the logical deduction from this fact is, that in whole wheat flour these important mineral elements are entirely preserved. The makers of these modern (vicious) flours in thus—either ignorantly or designedly—destroying the food value of their wares, have made straight the paths of the drug-monger, who has reaped golden harvests during the past twenty years, trying with his costly phosphate compounds to replace those potent elements which the miller has thrown out of the universal food; elements that inscrutable chemist-nature has compacted in the wheat-berry with a deftness, an all-wise design, human chemists, with all their capacity for substitution are incompetent to achieve. But, says the optimist: Fine white wheat flour bread is more pleasing to the palate and to the eye. Why, then, should we not serenely eat of it and let the drug-monger supplement it with the minerals it is said to lack, taking them in heroic doses as though they were grace after meat? The reply is: The artificial cannot equal the real, however accurate the imitation may be. To largely eliminate the food elements of the flour, in order to cater to the untenable likes or dislikes of the uninformed, then to attempt to hedge by replacing those discarded natural principles with the chemists' varying inventions, is irrational and un-hygienic, forasmuch as it contravenes immutable law. The celebrated Majendie found, many years ago, that dogs fed exclusively on white bread died in fifty days. Others fed on coarse bread exclusively lived and thrived. These experiments of the eminent Frenchman, were carefully made and were numerous. They should not have been forgotten.

In a recent article in a foreign newspaper, which evidently is from the pen of an expert, I find the subjoined paragraphs. They are worthy careful reading:

We have only to consider the composition of the wheat-berry, and to know what portions of it are used for the bread we eat, to realize the amount of material that is wasted in the present system of panification.

Proceeding from the outside to the inside of the wheat-berry is composed of the following portions: 1. An external wrapping, or episperm, containing only fibers, fatty and aromatic substances, and salts, representing 14$\frac{36}{100}$ per cent of the total weight of the berry. 2. A farinaceous portion, equal to 84$\frac{21}{100}$ of the total weight, and whose richness in starch increases from the periphery to the center, whereas the amount of gluten and phosphates increases from the center to the periphery. 3. The germ, or embryo, which is only equal to $1\frac{13}{100}$ of the weight of the berry, but is very rich in phosphates and in nitrogenous and fatty substances

The mineral substances are composed largely of very assimilable phosphates; they are chiefly to be found in the germ, or embryo, which is usually thrown away with the other unused parts, especially now that millingstones have been replaced by metallic cylinders, and their richness in nitrogenous and fatty matter is relatively considerable The layer of starch that sticks to the inner layer of the episperm, and is hard to separate from it, remains with the gray meal that is not mixed with the fine white flour, or white meal, for fear of altering the color of the bread.

In this way is produced a flour of good quality, containing only six grams of mineral substances, whereas the kilogram of wheat that furnished it contains ten. The difference is so marked that the time seems to have come to use every possible effort to find some way of remedying it.

From what we have said it will have been seen that as regards introducing phosphates into our daily food it would be very advantageous to use not only the germs, but the most peripheral gray and red portions of the grain Bread will only be entire when it contains all the truly alimentary portions of the wheat-berry. This, however, is very different from what is meant by persons who consider entire bread as ordinary bread to which the bran has been added. Once more let it be said that the only bread worthy of such a denomination is that made with flour containing all the assimilable elements of the wheat by being sent a number of times through the grinding surfaces. The difficulty is to separate by bolting the coarse bran, which is of no use, from the starchy portions that adhere so closely to the fine bran that lines the coarse wrapping of the berry.

There is evidently a happy medium to be found between bread that is too white and the too entire bread that certain enthusiasts wish to impose upon us as the ideal of bakery, and which by containing a great deal of bran is useful to persons whose intestinal functions are not what they should be, but is of no advantage to healthy persons. The country bread, *pain de menage*, which was formerly so extensively used, is both nourishing and agreeable to the taste, and we regret very much that this bread has gradually disappeared from use in large cities as being an inferior article.

The mission of hygiene is to rescue the people from the heavy hands of the food adulterator and his alter ego. the drug-monger, who reaps where the other has sown. Dissemination of the truths of the comprehensive science of dietetics is a means to the benign end, and the legislative and other work done in this direction during the past decade has not been done in vain, as its fruitage amply attests.

Edward Smith, M. D., LL. B., F R. S., Fellow of the Royal College of Physicians of London, etc , in a book on "Foods," published by D. Appleton & Co , speaking of the retention of bran in the flour and of the brown bread made therefrom, says this outside layer of wheat, the coarse bran, being covered with a layer of silica, is indigestible, remains as a foreign body in the bowels and is apt to get up irritation; that the only nutritive value which it contains is in the gluten and starch which lie in its inner side. He says: "This laxative quality may be medicinal, but it is not nutritious, and may be more useful in one form than another, and at one time than another. That it can add directly to nutrition is impossible, and whilst it may be more useful to those who are well fed and need a laxative, it may be worse than useless to the ill fed, who need nourishment. * * * The disadvantage of its use was insisted upon by me when treating on the dietaries of the poor, and the compulsory dietaries of prisoners and paupers, and it was shown that the discarding of it by the poor in favor of a finer flour was based on sound experience of its value. * * * It was also shown that bread was more agreeable without it, and the children of the poor were content to eat it dry when they would have been disgusted with dry brown bread, or would have required treacle or some savory or expensive addition to induce them to eat it. Thus it was shown that white bread is now the poor man's food."

Alexander Winter Blyth, M. R. C. S., F. C. S., etc., a very prominent English physician and chemist, in "Foods: Their Composition and Analysis," a work of nearly six hundred pages, after describing the different kinds of bread in use and their relative nutritive value, says: "It is thus shown that of the black bread a person would have to eat very much more than of the white bread. The white wheaten bread was nearly all absorbed. That this experiment was not made with whole wheaten bread is true, but it still unmistakably casts some doubt on the question as to whether whole meal would be more nourishing than pure white flour."

NUTRITIVE VALUE OF FLOUR.

In Bulletin No. 21, of the United States Department of Agriculture, is given the results of investigations on the Chemistry and Economy of Foods, by Prof. W. O. Atwater, Ph. D., a chemist whose opinions and reports are entitled to the greatest respect. In Table Two, page thirty-three, he gives the relative percentage of nutrients in different kinds of grain, to wit:

MATERIAL.		Water.	NUTRIENTS.				
			Protein.	Fat.	Carbo-hydrates.	Mineral matters.	Total.
Rye flour...................	Min.	12·4	·6	·8	77·9	·6	86·4
	Max.	13·6	7·1	·9	79·5	·8	87·6
	Aver.	13·1	6·7	·8	78·7	·7	86·9
Wheat flour...............	Min.	8·2	8·6	·6	71·6	·3	85·7
	Max.	14·3	13·6	1·8	79·5	·7	91·8
	Aver.	12·5	11	1·1	74·9	·5	87·5
Graham flour..............	Min.	12·1	11·3	1·5	71·6	1·7	86·3
	Max.	13·7	12·4	1·9	72	2	87·9
	Aver.	13·1	11·7	1·7	71·7	1·8	86·9
Entire wheat flour..........	Min.	12·9	13·1	1·9	69·5	1·4	86·9
	Max.	13·1	14·1	2	70·5	1·4	87·1
	Aver.	13	13·6	2	70	1·4	87

In Table Thirteen, page seventy, he gives the percentage of the nutrients of wheat, digested as follows:

	PROTEIN.	FAT.	CARBO-HYDRATES.
Wheat flour, fine	85	80	95
Wheat flour, medium	81	80	95
Wheat flour, coarse	75	80	95
Wheat bread	7·1	1·4	53·4

He sums up his research by saying: "We shall never be able to lay down hard and fast rules to apply to all cases as to how much of each of the different nutritive ingredients of food are needed to supply the demands of people of different age, sex and occupation, because of the differences between individuals in respect of their demands for nutriment and the ways in which their bodies can make use of different kinds of food.

"The purpose of these investigations is to secure the proportions of nutritive ingredients; their digestibility; their fuel values; the ratio between their values for nutriment and their cost; the kinds of food and proportions of nutriments best adapted to the people of different classes and occupations; the errors in our food economy, and the sociological and agricultural bearings of the subject. All bear directly or indirectly upon health, home life and household, agricultural and national economy."

HOW FOOD IS USED IN THE BODY.

"Food supplies the wants of the body in several ways:

1. To form the tissues and fluids.
2. To repair the wastes of tissues.
3. Is stored for future consumption.
4. Is consumed as fuel, its potential energy being transformed into heat, or muscular energy, or other forms of energy required by the body.
5. In being consumed protects tissues or other food from consumption."

USES OF THE NUTRIENTS.

Protein forms tissue (muscle, tendon, etc., and fat) and serves as fuel.	All yield energy in form of heat and muscular strength.
Fats form fatty tissue (not muscle, etc.) and serve as fuel.	
Carbo-hydrates are transformed into fat and serve as fuel.	

The bodily machine is made of protein. The blood, muscle, tendon, bone and brain, all consist of, or at least contain, protein compounds. As the muscles and other tissues are used up in bodily activity, the same materials of the food are used for their repair.

HEALTHFUL BREAD.

Dr. J. W. Smith, Charles City, Iowa, writes as follows:

If bread is the most essential form of human food, it may well be called "the staff of life." It is then highly important that bread should be made in the best possible manner. While it admits of great variation as to material and manufacture, there are essential qualities that cannot be ignored. They are the God-given elements in all the best cereal grains of which bread is made.

Milk is called a perfect food, especially for children, as it contains in proper proportion all the elements necessary for the growth of the young being, child or animal. The fact plainly shows the wisdom and goodness of the Creator. The grains, wheat, rye, oats, barley, corn, rice, etc., also contain elements just as essential for the growth and sustenance of human beings at a little older period of life than when only a milk diet is used.

Fashion is said to rule the world, and not always wisely. If we grow wiser in some things, we are also in great danger of growing weaker in some other things. White flour, and the whiter the better, has been the rule with most of our most estimable lady cooks until a vast injury has been done to the human race, especially in the United States.

If the mass of the people continue on for a few more generations, like the past few, good teeth will be a thing of the past, and almost any teeth in an adult American will be so unusual as to be a curiosity. Neither will the injury stop with the almost universal loss of the teeth—so essential to good health. Their loss also indicates a general failure or breaking down of all the powers of the body.

Many serious diseases, especially of the digestive organs, are directly caused by improper food, or that which lacks some element or elements necessary for the growth and sustenance of all parts of the human body in a healthy condition. Can we not and will we not learn by observation and experience? Must fashion be followed to the destruction of health and life itself?

God is wiser than we are—is all-wise—and constituted the cereal grains in the most perfect manner for food of human beings. In the manufacture of the whitest flour certain elements essential to the nourishment of portions of the body are almost wholly excluded. Unless such elements are replaced in some way, the work of growth and repair for the whole body cannot go on.

The teeth, the nerves, and digestion are among the first parts to suffer. The dentist, the doctor and patent medicine men try their vocation upon all the sufferers—not always knowing the chief cause of their increasing gains. Of what use is the teaching of physiology (?) in our public schools if its lessons are to be generally ignored by fashionable living? The children are not to blame, but parents and teachers must be held chiefly responsible for much sickness and death of the young.

We hear much about high civilization in our land. How does human health and endurance here compare with nations that uniformly use "black" or unbolted flour for bread? Is not high health preferable to so called culture that destroys good health and results in an effete class or nation?

A campaign for correct living is a necessity in our nation, at least, if we do not wish to see others of more robust health soon take our places and of our children. To prevent such a result, plain, wholesome foods and simple, correct living must soon take the place of much of our present methods. Good bread is about three times as nutritious by weight as the best meat. But the best bread cannot be made from the whitest flour. It must contain a certain proportion of all the excluded portion of the kernel of the grain. Wheat comes the nearest to a perfect food of all the grains, when used in nearly the unbolted form. Good flour cannot be made from poor grain nor good bread of bad flour. Ergot in rye has caused mortification of the limbs.

Most of the bread of civilized nations is made with some form of yeast, and a fair article of bread can be made with the many forms of yeast; but there are objections to all such bread. The effect of yeast is to commence a fermentation, or really a rotting process in the flour, and which is intended to be stopped by baking the dough at the proper stage. It is not always easy or even possible to stop the fermentation at such stage. If done too soon the bread will be heavy. If done too late the bread will be over-fermented—a "big loaf," probably sour, and its food value much lessened: The latter form is the kind of bread usually found in most country bakeries and in many families. The large cities usually have good bread, of the kinds made. Alum and other drugs are sometimes used with poor flour and badly managed bread.

By unleavened bread is meant almost any form that is not made with yeast or any form of "baking powder." Aërated bread is now used almost wholly in London and some other cities of Europe, and has been to some extent in American cities. It is made by pressing air into the dough by machinery, and baking at once. It is probably the nearest to a perfect bread, and there is no loss of nutritive value, as happens with all yeast bread. Perhaps from popular prejudice for yeast bread, or the difficulties of the manufacture of aërated bread, yeast bread is still in general use.

The writer firmly believes that there is a more excellent way of bread-making than those now in general use, and that it is also some kind of unleavened bread.

FRUITS.

Ripe fruits of nearly all kinds, are attractive, delicious, appetizing and healthful. They may be placed in the first rank of subsidiary, or luxurious food, since they supply an agreeable and refreshing material when eaten alone, or with other food. They may be taken by the sick, when all else is rejected, and thus by acting on the sense of taste, a desire be stimulated for nutritious food.

The principal varieties, in use, are:

1. The apple, pear and quince.
2. The orange, lemon and lime.
3. The plum, peach, apricot, cherry, olive and date.
4. The grape, gooseberry, currant, cranberry, barberry.
5. The strawberry, raspberry, blackberry, mulberry.
6. The melon, pineapple, fig, banana.

Bauer gives the following average composition of some of the most important of these:

	Apple.	Pear.	Peach.	Grape.	Straw-berry.	Currant.	Orange. (Pulp only.)
Water	83·58	83·03	80·03	78·18	87·66	84·77	89·01
Nitrogenous matters	·39	·36	·65	·59	1·07	·51	·73
Free acids	·84	·20	·92	·70	·93	2·15	2·44
Sugar	7·73	8·26	4·48	14·36	6·28	6·38	4·59
Non-nitrogenous matters	5·17	3·54	7·17	1·96	·48	·90	·95
Cellulose and kernel	1·98	4·30	6·06	3·60	2·32	4·57	1·79
Ash	·31	·31	·69	·53	·81	·72	·49

The analysis shows these fruits to be rich in potash salts; the apple and strawberry rich in soda salts. They also contain salts of lime, magnesia and iron; also salts of vegetables (malates, citrates, tartrates) and some free acid.

Their chief food value is in the sugar they contain. When taken in moderate quantity they are cooling and refreshing, and tend to promote intestinal action, and correct a tendency to constipation.

Some of them more nearly approach to food than others. The olive offers a true food in the form of oil, and stimulates the appetite, when pickled, so that it serves the poor and ill fed in the former, and the rich and over fed in the latter. In the fresh state it is eaten daily by rich and poor as a pleasing fruit and as a true food.

The date, is a highly nutritious fruit. It contains fifty-eight per cent of sugar, and is eaten when fresh or dried. It is one of the chief articles of food of the Arab.

Of the apple, Dr. R. G. Searles, of Brooklyn, N. Y., says:

> The apple is such a common fruit that very few persons are familiar with its remarkably efficacious medical properties. Everybody ought to know that the very best thing they can do is to eat apples just before retiring for the night. Persons uninitiated in the mysteries of the fruit are

liable to throw up their hands in horror at the visions of dyspepsia which such a suggestion may summon up, but no harm can come to even a delicate system by the eating of ripe and juicy apples just before going to bed. The apple is an excellent brain food, because it has more phosphoric acid in easily digestible shape than other fruit. It excites the action of the liver, promotes sound and healthy sleep, and thoroughly disinfects the mouth. This is not all. The apple helps the kidney secretions and prevents calculus growths, while it obviates indigestion and is one of the best preventives known of diseases of the throat. Everybody should be familiar with such knowledge.

Most persons who discard fruit because of their fear of appendicitis use the pulpy fruits, such as apples, pears, plums and peaches freely and confidently, while they deny themselves the many-seeded fruits such as raspberries, blackberries, strawberries, grapes, etc. These small and many-seeded fruits can always be eaten with impunity if taken with other food, especially with bread, potatoes and such glutinous and starchy foods as afford a covering for the seeds. It is surprising what sharp and rough and indigestible substances will safely pass through the whole intestinal track without doing any injury at all, if plenty of potatoes, bread, or oatmeal is eaten at the same time. The best time to eat any fruit is at the table and with other food. Appendicitis is not any more common than it used to be. It is only more generally recognized, and it is the explanation of many sudden and fatal attacks of peritonitis, or inflammation of the bowels—the causes of which were unknown. It is foolish for persons to deny themselves the pleasure of eating fruit through fear of infection by microbes or appendicitis because perhaps one in a million persons happens to get a seed in the "appendix." Fruits are among God's good creatures grown for the delight, enjoyment and physical benefit of rich and poor, prince and peasant.

All fruits with skins on should be washed and peeled before eating — especially fruits exposed on the streets and where dust and flies can have access to them. Few are aware of the danger of food contamination by flies. They are great scavengers, and are not at all choice as to what they eat, nor where they step. They pass at one bound from an infectious carcass, a foul ulcer, or a mass of diseased sputum or reeking filth to the apple, pear or peach, and with dirty feet and dirty proboscis run over it and contaminate it. Hence all such fruit should be first washed and dried and then pared if possible. Even food to be cooked ought for cleanliness sake to be washed if cooked with the skin on.

TUBERCULOSIS.

ITS PREVENTION.

At the May meeting, 1897, of the Board, Dr. J. M. Emmert presented the following paper, which was ordered printed:

Can tuberculosis be prevented? is one of the most important questions of the day. Sanitarians, physicians and other scientists are not alone interested in this question, but it is of vital interest to every father and mother, brother and sister.

When we remember that the "Great White Plague" is the cause of every seventh death; that in the State of Iowa nine persons die of tuberculosis every day, three thousand every year; that the United States contributes every year one hundred and fifty thousand and the world five million, I say, when these facts confront us it is no wonder that the people are asking what can be done to prevent this disease All infectious and contagious diseases are preventable to a certain extent, and among the list there is none that has received so much patient, scientific study and investigation as that of tuberculosis, and to-day there is no disease in the infectious and contagious list that we so thoroughly understand the natural history of, the germ causing the disease, its modes of growth, products of growth, its climatic distribution and modes of infection.

Notwithstanding the accumulated knowledge upon this subject, and our thorough understanding of the disease, we have made but little advancement toward preventing or stamping out the disease.

Our boasted knowledge of the cause of the disease is of little use to humanity if we do not use it in applying preventive measures.

The disease can be prevented to such an extent that many valuable lives may be saved by obeying certain hygienic and sanitary laws, thereby rendering persons less susceptible to the disease and removing the cause, which consists in destroying the pathogenic germs.

Hereditary transmission is now looked upon as very doubtful, if not impossible, but there is inherited a condition that predisposes the person to the disease, a condition that makes of the system a suitable culture by inviting the disease and making it dangerous for the person to breathe air but slightly contaminated with poison, and for even a few minutes

This class of persons can do much in avoiding the disease and live long and healthy lives by giving special attention to personal hygiene.

The most important factor in preventing the disease in predisposed persons is that of fresh air and sunlight. God has given man no better disinfectant or disease destroyer than these two universal elements. The person should live in the fresh air and sunshine as much as possible. Dr. Trudeau.

of Baltimore, in a paper before the American Climatic Association, very truthfully says: "All means which tend to increase the vitality of the body cells have been found to be precisely those which are most effectual in combating tuberculosis: one by one, specific methods of treatment which for a season enjoyed popularity have fallen into disuse, and hygienic, climatic, and feeding--in other words, a favorable environment, have alone given results which have stood the test of time." The home should be high and dry: no damp cellars, no leaky sewer pipes, or cesspools, or filth piles should be tolerated: the sleeping room should be well ventilated and living rooms the same; all indulgence in alcoholic liquors, tobacco, over-eating, worry, anxiety and mental strain should be avoided. All these lower the vitality, and consequently the personal resistance.

The methods of infection are almost entirely confined to two sources: from tuberculous animals to man, and from one human being to another. There are two principal channels by which the germs get into the system, the lungs and stomach. Although direct inoculation by way of denuded surfaces may, and often does take place, as in operation and *post mortem* wounds, it has been abundantly proven that eating uncooked or partially cooked tuberculous meat, and drinking milk containing the tuberculous bacilli, will produce tuberculosis in the human being.

To avoid the danger of infection from meat and milk there should be a most rigid system of inspection of all cattle for food and milk supply in each county. This should apply not only to the larger towns and cities, but to the villages as well, with supervision over all farm stock. Literature should be distributed among the dairymen and farmers, instructing them how to house, feed and care for their cattle to prevent tuberculosis; they should also be instructed how to use the tuberculin test, and how to treat all suspected animals. In by far the largest number of cases, tuberculosis has been caused by the disease in some other human being. If we ever succeed in preventing tuberculosis, it will have to be along the line of personal and legal control of those already infected. This may not necessarily mean strict quarantine, but it does mean an abridgement of personal liberties, a medical or legal supervision of action, with entire control of all excretions from lungs and bowels.

Every case of pulmonary tuberculosis is a walking culture bed, sowing seed broadcast. He is a wholesale dealer in his particular line of living germs; he is a living example of the parable of the sower: "A sower went forth to sow his seed, and as he sowed, some fell by the wayside, and others fell on good ground, and it sprang forth and bore fruit an hundred fold." Unfortunately for the human family many fall on good ground and keep up the fearful mortality stated in the beginning of this paper. There is no longer any doubt as to the correctness of Koch's theory; the germ has been isolated and injected into animals, producing this disease, demonstrating that the bacillus is the cause of the disease.

But of as much, if not more interest to us, is the fact that the sputa of a pulmonary tuberculous patient is loaded with these germs, and that this sputa fed to animals or injected into them will produce the disease. It has also been proven by scientific investigation and demonstrated that these germs will maintain their vitality for months in a dry state, floating in the air, to be carried into the lungs of the unsuspecting victim.

Some authors go so far as to say that ninety per cent of cases are produced by inhaled germs thrown off in the sputa of an infected person. If these statements are true. and I believe they are, how necessary it is to prevent the spitting by tuberculous persons, upon the streets, in stores, hotels, depots, railway cars, in fact, anywhere and everywhere, except a receiving vessel, containing a strong antiseptic solution, or in cloths or other materials that can be burned at once.

The promiscuous spitting of tuberculous matter is not only spreading the disease throughout the inhabited globe, but is making a pest-house out of some of the most healthful parts of the country, but unfortunately used for health resorts for these patients.

The Denver *Medical Times* says: "It was some time ago intimated in an Eastern paper that the streets and walks of Denver were covered with the sputa of consumptives. The statement was not far from the truth. Unless very rigid measures for the prevention of the spread of consumption in Colorado are adopted and put into force, Colorado will become a pest-hole." The *Pacific Medical Journal*, recognizing the danger, insists upon stringent measures being adopted to stop expectoration upon and about public places. The inhabitants of Los Angeles have become aroused to the danger of indiscriminate mingling of consumptives with healthy persons, and the board of health of this city has passed an ordinance against expectorating upon the streets and in public places. San Francisco has passed the same kind of an ordinance which, so far, has been impracticable. While the people are not ready to endorse and give their moral support to the enforcement of a street quarantine law, a law can be so drawn as to have the endorsement of the best people of every community; such a law should require the placarding the premises to warn the predisposed from entering, to require the sputa to be received in cloths and upon paper, and immediately burned. The first law of nature, self-preservation, would demand at least this much. The patient should not be allowed to attend large gatherings, especially in closed rooms containing children. They should be allowed to travel the streets, walks and roadways only when they carry receiving vessels for the sputa, and a fine should be attached for expectorating, except in this vessel, while absent from the house. The eminent sanitarian, Henry B. Baker, secretary of the Michigan State Board of Health, advises small pieces of cloths, each large enough to receive one sputum, and parafined paper envelopes or wrappers in which the cloth as soon as once used may be put and securely enclosed, and with its envelope, burned on the first opportunity

Dr. George Casnet, of the Berlin Hygienic Institute, with the dust gathered from the walls of rooms inhabited by tuberculous persons, and not contaminated directly with the sputum, has, upon being mixed with sterilized bouillon, and then injected into the peritoneal cavity of guinea pigs, produced tuberculosis. Twenty-one hospital wards were examined in the same way and the dust from fifteen of them produced tuberculosis. This admonishes us that thorough disinfection of all buildings, rooms and wards where persons have died of tuberculosis should be had, and that all sick rooms should be ventilated as thoroughly and as often as possible, as well as occasionally washing down the walls with a disinfectant and then whitewashed, which also should contain some disinfectant not injurious when inhaled. There is another sower that has attracted some attention lately and will more in the future; that is the railway coach, and especially the elegant Pullman cars; they are veritable "whited sepulchers, which indeed appear beautiful outwardly, but within are full of dead men's bones, and of all uncleanliness." With all its magnificent settings, rich tapestries and beautiful velvet curtains, it is a modern death-trap of the worst kind Think of being closed up a room forty feet long and ten feet wide, containing probably forty persons, among them two or three consumptives, without any ventilation, except when the doors are open, and then for a moment, filled with hangings and velvet-covered seats that had accommodated probably hundreds of tuberculous and other diseased persons, with only an occasional dusting which only brought out the germs that had hidden in the dead recesses of the velvet folds, ashamed to look a poor mortal in the eye because he had no chance for his life. But this will all be corrected in the future.

The votaries of sanitary science, and those who love their fellow men, like Abou Ben Adhem, will rise up and demand that a sanitary car be built that will reduce the dangers of disease to a minimum. The law should demand that every trunk line, running through trains, should carry a hospital car, not only for the protection of the well but for the comfort of the sick. The closets upon cars should be so arranged that the dejecta could be received into a strong disinfectant before being thrown to the ground. It has been proven that the dejecta, both urine and fecal matter, contains millions of germs, and these germs are now being dropped all over this country to be dried and scattered to the four winds of heaven.

I have, in a very brief and disconnected manner pointed out a few of the important measures for arresting tuberculosis, and firmly believe that if they, as well as others, could be enacted into laws, the mortality from tuberculosis in the future would decline in a direct ratio to the enforcement of said laws.

CAUSE AND PREVENTION.*

In presenting this paper for your consideration I shall assume that you are all in sympathy with the germ theory as to the cause of tuberculosis — that with Koch you assent to the apparently well demonstrated proposition that tuberculosis in all its forms, whether occurring in the human or animal subject, is the result of morbific conditions arising from the presence and multiplication of the bacillus tuberculosis. If you are not a believer in that proposition I shall not at this time undertake to prove it.

Assuming therefore that this theory is correct, with the knowledge we have of the vitality and life processes of this bacillus, we are led to believe from analogy and from demonstration, that the disease produced by it is easily communicable: that it is contagious: and that the only successful way of combating it is by disinfection, or those measures that will most readily destroy the vitality of these micro-organisms.

In order best to treat the subject of this paper — The Prevention of Tuberculosis — your attention should be called to the generally admitted, and most common means of infection. There are two general sources: From tuberculous animals, by their flesh and milk to man; and from one human being to another.

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*Read by Dr. J. F. Kennedy before the Polk County Medical Society, at Des Moines, July 6, 1897.

It is generally supposed that tubercular affections of the brain and bowels in children are caused by the ingestion of tuberculous milk and that these manifestations of the disease may be produced in the adult in the same way.

The methods of transmission from the human are fortunately comparatively few. As to heredity it is pretty generally believed that the disease is not transmitted, and yet there can be no doubt that children born of tubercular parents are more susceptible to the disease than others — that the bacillus, if introduced into the system, finds less resistance from a lowered vitality, and hence conditions are more favorable for its growth and multiplication.

Catarrhal affections, successive "colds" and pneumonia — especially when it assumes a chronic form — all favor the growth and development of the bacillus.

Among the indirect causes of tuberculosis, aside from heredity, are confinement in prisons and barracks; employment in crowded and ill-ventilated rooms; and occupations that require the breathing of dust and other foreign substances.

The most common direct cause, however, is the inhalation of the dried sputum of consumptives. It has been quite satisfactorily demonstrated that the breath of the consumptive is not infectious, and that the sputum itself is not, so long as it remains moist.

As a final proposition, it may be safe to say tuberculous infection is produced in the great majority of cases by the inhalation of dust laden with dried and pulverized tuberculous sputum.

The greatest and most rational preventive measures, therefore, are the destruction by burning, or the thorough disinfection of all tuberculous sputum; and care that the milk, butter and meat that are used are from non-tuberculous animals.

I have not the time, nor is it necessary to detail the methods of the prevention of tubercular infection by tuberculous sputum, and by food. Our text-books, medical journals, and lectures upon hygiene and preventive medicine, and all well-regulated colleges, happily abound in such information. I design rather, this evening, to enter a field not so well explored; to emphasize some conditions that very largely, though somewhat indirectly, contribute to this disease, and to recommend some preventive measures that are practical, and I believe if more generally and faithfully carried out would greatly reduce the number of cases, and as greatly increase the number of recoveries.

As before hinted, whatever undermines the general health increases the susceptibility to the infection, and diminishes the power of recovery from incipient or advanced tuberculosis. The highest condition of health and resistful vitality is best promoted by the habitual breathing of pure air. I believe the greatest enemy to the bacillus tuberculosis is an abundance of oxygen, as found in pure, fresh air.

The open air treatment of consumptives and of those threatened with tuberculous disease, has, when systematically carried out, given better results than any other. In Germany, and to some extent in this country, the systematic treatment of those believed to be predisposed, and of those afflicted with tuberculosis in various stages, is resorted to in "sanitaria," with the most encouraging results. In these resorts the inmates have the advantage of a regular life, nutritious food, such exercise and chest distension as they can bear, and above all, an abundance of fresh air. Even in the coldest winter weather, patients, after gradual habituation, pass the whole day walking in the open air, or sitting or lying in resting places comfortably wrapped in blankets. No claim is made for the advantage of climate—the all-important thing being an abundance of pure air.

Recently a book has been written by G. W. Hambleton, M. D., of London, England, on "The Suppression of Consumption." In his preface he says:

"Great cities are the centers of consumption, and far away from them, on the borders of advancing civilization, 'nature's cures' have been frequently accomplished. * * * The responsibility for the suppression of consumption rests with us."

The writer makes this bold proposition, and produces an array of evidence in support of it:

"*Consumption is the direct result of the reduction of the breathing surface of the lungs below a certain point, in proportion to the remainder of the body, and is solely produced by conditions that tend to reduce the breathing capacity of the lungs.*"

He can see no connection between consumption and impure air, night air, colds, catarrh, hereditary influences, improper food, insalubrious residences, improper sewerage or climatic conditions.

I think his position is rather sweeping, and yet there is much in it to commend. He says:

"I have experimentally produced consumption by these conditions. On one occasion I took a well-developed chest and gradually submitted it to conditions that tend to reduce the breathing capacity, and at the same time so far as possible placed impediments to the performance of compensatory action by other organs At first there was a reduction of the chest girth, a wasting of the muscles, a loss of the range of extension, the well-known change in shape, and increased frequency of breathing. This was soon associated with catarrh, pain in the chest, steady loss of weight, and hectic; and the process was continued until I was satisfied that consumption was well established. Then I induced compensatory action by other organs, and submitted the lungs to conditions that tended to develop them. This was followed by great relief in the chest symptoms, which eventually greatly disappeared, by a restoration of the general health, a return to the normal weight, and a change in the shape of the chest in the opposite direction, and I continued the process till the chest had regained its full development, and there was sound health. Each step in the experiment was carefully verified, the same sequence invariably observed, and I have both traced the presence of conditions and watched their progress in many cases of consumption."

"We can at any time watch the direct production of consumption by the constant inhalation of small particles of various substances, in strong, healthy men who have been brought up in the country, and we know the disease has been produced in this way for generations. * * * Occupations that are carried on in small, crowded, or badly-ventilated rooms, where the respiratory functions are impeded, or those in which there is a long continued cramped position of the chest, have long been notorious for the production of consumption."

Dr. Hambleton cites various occupations and conditions of life as illustrating his proposition—showing that the worst districts in England were not so productive of consumption as the English army—that notwithstanding these men were selected because of their physique—were examined before being enlisted, and reëxamined in three months, yet an unusually large proportion became consumptive owing to the changed conditions of life, to the impure air of the barracks, and to the compression of the chest by clothing, and by a variety of conditions that tend to reduce the breathing capacity. He cites the fact that many animals that never in their wild and unrestrained conditions develop consumption die from the disease within a few months or years after being confined—that strong, healthy women, accustomed to work in the fields, go to Paris, put on corsets, restrict their breathing capacity, and furnish the majority of consumptive subjects; that the children of consumptive parents, though born with as well developed chests as those born of healthy parents, because of the care taken of them to prevent colds by exposure, and because of heavier clothing that interferes with breathing, early develop the disease; that from greater indoor life and greater chest compression, the women of our country homes are more liable to consumption than the men.

He speaks of the easy facilities for travel existing to-day as conducive to consumption, and the reluctance of the people to walking if they can ride, and that by the invention of machinery so much is done now that formerly required muscular exertion. The construction of modern houses—the effort to make them impervious to outside air—creating a hyper-sensitiveness to cold, and preventing us from venturing out more than necessary during the colder winter months, also favors the production of the disease.

But I have said enough to give you an idea of Dr. Hambleton's theory as to the cause of consumption, and will not weary you with further details, except to give you his conclusions:

1. Consumption has been experimentally produced by conditions that tend to reduce the breathing capacity. Koch's successful experiments were directly produced by those conditions.

2. We can at any time watch the direct production of consumption by these conditions in the dust-inhaling trades.

3. The trades and occupations that directly compress the thorax, or impede the respiratory functions are notorious for their production of consumption.

4. A large amount of consumption is produced in the army every year by these conditions.

5. Consumption has been repeatedly produced by confinement, both in man and animals.

6. The children of consumptive parents who become diseased have been carefully brought up under such conditions.

7. Consumption bears the mark of the effects of the progressive action of such conditions from its commencement to its termination.

8. There is no recorded case of consumption, experimental or not, in which these conditions were absent.

9. Where such conditions are absent there is no consumption in man or animal.

10. Upon their introduction, consumption immediately appears, both among men and in animals.

11. The disease presents a perfectly natural series of events when viewed in this light.

12. Its presence in our midst is due to the changes in our habits, mode of life and surroundings, that are being affected by the progressive advances of civilization.

13. Consumption has been prevented by the removal or counteraction of those conditions. The immunity of mountaineers is due to their capacious lungs.

14. The disease has been frequently arrested for a longer or shorter period by the accidental or deliberate adoption of measures that tended to compensate for, or counteract those conditions.

15. That both the experimental and the practical application of measures that tend to compensate for, and counteract those conditions have been invariably followed by the arrest and subsequent complete recovery from consumption, where the disease was not too extensive; and the same process has obtained in the thousands of cases of cure by nature, and by Sydenham. * * * Consequently we now have it in our power to secure, with absolute certainty, the prevention of, and recovery from consumption."

The preventive measures recommended by our author are erect carriage of the body: chest expansion by a systematic course of full inspirations; life out doors so far as possible; the freest and fullest ventilation of our homes: the discarding of all clothing or occupations that restrict chest expansion; the maintenance, so far as possible, of the highest and most perfect physical vigor by proper food, exercise, cleanliness, etc., having constantly in view, however, in all preventive measures the proposition so emphatically enunciated. "that consumption is the direct result of the reduction of the breathing surface of the lungs below a certain point, in proportion to the remainder of the body, and is solely produced by conditions that tend to reduce the breathing capacity "

Dr. Hambleton writes as an enthusiast—perhaps as a faddist - but he refers to more than a score of our most noted medical authors in support of one or more of his propositions. I firmly believe that the preventive and curative measures recommended by him *conjointly* with the methods of disinfection recommended by the advocates of the germ theory, afford methods of prevention that, if faithfully carried out, will materially reduce the number of cases and greatly lessen the fatalities of this dreaded "white plague."

Vital statistics furnished by the Register-General of Great Britain show that the deaths from this disease have, because of more intelligent preventive and curative methods, been declining in number the last ten years, and Dr. S. W. Abbott, of Boston, secretary of the Massachusetts State Board of Health, makes the same observation as to Massachusetts. He attributes this falling off largely to the extensive use of the bicycle, espepecially by women.

I verily believe if the preventive measures above recommended are rigidly and faithfully observed for the next twenty years there will be a most surprising as well as gratifying falling off of cases of tuberculosis, and that the methods of treatment recommended will commend themselves to the laity as well as to all schools of medical practice because of the large number of recoveries.

In order that the best results from this treatment may be witnessed it is important that the treatment should begin early. Indeed, the treatment should begin before the disease has really stamped its impress upon the subject, and be continued until the chest development and the general health are so improved as to render the subject immune, or until recovery is complete. Chest measurements should be taken and carefully noted, and where the lung capacity is below the normal, persistent and intelligent measures should be adopted and persevered in until the breathing capacity has been brought up to or beyond the normal.

Where practical, treatment should be in hospitals or sanitaria, located and constructed with the most favorable sanitary conditions, and where the system of chest development would be intelligently and persistently prosecuted. With a will and determination, however, to get well no such appliances are essential. The patient at home can by his or her own individual efforts, under the direction of an intelligent physician, successfully combat the disease and regain and maintain excellent health.

So I believe a better and brighter day has dawned, and that you, gentlemen, who are in the thickest of the battle against this dreaded foe shall, by proper measures, preventive and curative, see "the travail of your soul and be satisfied" with the glorious victories achieved.

PERIL TO CONSUMPTIVE RESORTS.

The observation of several years has forced the conviction that it is a great misfortune for any place to get a reputation as a favorable resort for consumptives; that the time is not far distant when the favored resorts of this country for those so afflicted would be so saturated with and dominated by the germs of this infectious disease as to be a constant menace to those who are native born and to the healthy sojourner.

It cannot be otherwise unless the universally accepted theory of its contagiousness be untrue. These patients wherever they go not only carry the contagious principle—the infectious germs with them, but in the sputa thrown from them they are constantly contaminating the soil and converting the delicious, invigorating, health-giving air provided by nature into a pestilential condition that is not only highly dangerous, but careful observation has shown has actually greatly increased the death rate in these health resorts.

This increased death rate from consumption is not alone caused by those going to these resorts for relief—many of whom are cured or greatly improved; but represents many of those who are born and raised there, or who have gone there in good health.

It is not caused by any changed climatic conditions—though it may to some extent be caused by changed social and domestic conditions—by less out door life; because of better air-and-sunshine-excluding homes, and less of life that is near to nature's heart.

When the South Sea Islands were discovered consumption had never been known. Since contact with Europeans and Americans, however, this disease has become so prevalent as to threaten the extermination of the people. As the climate has undergone no change, and the habits of the people have changed but little, Dr. William Budd thinks this striking contrast in the health of the people can only be explained on the theory that a new and specific germ—the bacillus tuberculosis—has been imported to these islands.

Attention is called to extracts from two able medical journals published in the most noted health resorts in this country, which are printed not to deter any consumptives from going to these resorts, but to point out the danger to their friends who accompany them, and to those with whom they associate, whether at home or abroad, as well as to emphasize the importance of disinfecting or burning the sputa, which are almost the only means of propagating and extending the disease, and also that other health resorts may be induced to take such timely measures as will prevent a like experience. The *Denver Medical Times* says:

> It was some time ago intimated in an Eastern paper that the streets and walks of Denver were covered with the sputa of consumptives. The statement was not far from the truth. Unless very rigid measures for the prevention of the spread of consumption in Colorado are adopted and put in force Colorado will become a "pest-hole." One thing that may help us out in this country is the fact that the amount of rainfall seems to be on the increase. There is no question that Colorado has probably the greatest climate in the world, all things considered, for the average consumptive, yet, in our opinion, it would be a fortunate and glorious day for Colorado to lose that reputation. With a better understanding of the cause of consumption and better knowledge of its prevention and better facilities and methods for its treatment, climate will not long, we trust, be a desideratum in the management of this disease. We now look upon tuberculosis and realize that it is the most contagious of all diseases known to humanity. Every consumptive who walks along one of our sidewalks and deposits a lump of tuberculous matter, loaded with consumptive germs, is deliberately, and, in most instances, intentionally doing that which will spread the very disease of which he is dying; and it was through just such criminal carelessness of some other consumptive that he contracted tuberculosis himself.

The *Pacific Medical Journal* has this to say:

> It was very clearly shown a few years ago by certain careful observers that consumptives are liable to cause a health resort to become a dangerous

place to visitors who were not already consumptives; and especially so to its permanent inhabitants. Certain localities on the Mediterranean coast to which consumptives have resorted for many years have become so infected that the native population have themseves become tuberculous. This was especially noticeable among laundresses who handled the garments of consumptives. This subject was brought up before the Sanitary Convention at Los Angeles and so thoroughly discussed that it has already commenced to bear fruit. It was pointed out at that time that the southern portion of California, which, for the past ten years, has so freely welcomed consumptives to come and make this country their home, showed signs of the coming danger. We see by a la'e Los Angeles paper that the community has become aroused to the danger of indiscriminate mingling of consumptives with healthy persons. Carefully collected statistics show that the native population of Southern California is becoming infected through contact with consumptives from the East. It has been the custom for families to take one or more invalids, irrespective of their disease, into the family for from three to six months. The result should have been foreseen: tuberculosis has gradually invaded the whole of Southern California.

It must be borne in mind that the surest method for the spread of this disease arises from indiscriminate expectoration. On drying there are set free numerous bacteria which are blown about by the wind and become mixed with the dust and breathed into the lungs. Indiscriminate spitting is the curse of the land. No spot is too sacred for the habitual spitter. In churches, halls, waiting rooms, at depots and public conveyances, everywhere in fact, you hear the hawking and spitting followed by the scrape of the foot as the spitter hastens disintegration of the sputum by rubbing the mass in the dust.

The Board of Health of Los Angeles a year or two ago passed an ordinance against expectorating on the streets and in public places, but there never has been any real attempt to enforce it. Every physician knows, or ought to know, that consumption is a contagious disease. He is in a position to better enlighten the people on this question than any other class, and he should never feel that he is out of place when proclaiming the doctrine of contagiousness of consumption and the care necessary to prevent its spread. Physicians must never permit a well person, especially a child, either to sleep or spend many hours continuously in the same room with a consumptive. There is already a growing conviction among the laity that there is something in this beside talk, and health boards at no very distant day will have the support of all right thinking persons in aiding the enforcement of strict sanitary laws.

In several cities ordinances against spitting in street cars have been vigorously enforced.

The San Francisco health board has authorized its attorneys to immediately prepare and have passed an ordinance for the prevention of expectoration on the sidewalks or in any conveyance.

Sir Benjamin Ward Richardson gives the following sanitary decalogue: First, pure air for breathing. Second, active exercise, outdoor as much as possible. Third, uniformity of climate. Fourth, dress that will sustain uniformity of warmth.

Fifth, careful regulation of the hours of rest by the sunlight. Sixth, outdoor occupation. Seventh, amusements that favor muscular development and sustain healthy respiration. Eighth, cleanliness in the broadest sense. Ninth, the avoidance of the ill-effects of cold. Tenth, an ample diet, with a full proportion of the respiratory foods.

TO CONSUMPTIVES AND OTHERS.

The health department of the city of New York has recently prepared for distribution the following circular, "Information for Consumptives and Those Living with Them:"

Consumption is a disease which can be taken from others and is not simply caused by colds. A cold may make it easier to take the disease. It is usually caused by germs which enter the body with the air breathed. The matter which consumptives cough or spit up contains these germs in great numbers—frequently millions are discharged in a single day. This matter, spit upon the floor, wall or elsewhere, is apt to dry, become pulverized and float in the air as dust. The dust contains the germs, and thus they enter the body with the air breathed. The breath of a consumptive does not contain the germs and will not produce the disease. A well person catches the disease from a consumptive only by in some way taking in the matter coughed up by the consumptive.

Consumption can often be cured if its nature is recognized early and proper means are taken for its treatment. *In a majority of cases it is not a fatal disease.*

It is not dangerous for other persons to live with a consumptive, if the matter coughed up by the consumptive is at once destroyed. This matter should not be spit upon the floor, carpet, stove, wall or street, or anywhere except into a cup kept for that purpose. The cup should contain water, so that the matter may not dry, and should be emptied into the closet at least twice a day, and carefully washed with hot water. Great care should be taken by a consumptive that his hands, face and clothing do not become soiled with the matter coughed up. If they do become soiled they should be at once washed with hot soap and water. When consumptives are away from home, the matter coughed up may be received on cloths, which should at once be burned on returning home. If handkerchiefs are used (worthless cloths which can be burned are much better) they should be boiled in water by themselves before being washed.

It is better for a consumptive to sleep alone, and his bed-clothing and personal clothing should be boiled and washed separately from the clothing belonging to other people.

Frequently a person suffering from consumption may not only do his usual work without giving the disease to others, but may also get well, if the matter coughed up is properly destroyed.

Rooms that have been occupied by consumptives should be thoroughly cleaned, scrubbed, whitewashed, painted or papered before they are again occupied. Carpets, rugs, bedding, etc., from rooms which have been occupied by consumptives, should be disinfected.

TENT LIFE FOR CONSUMPTIVES.

The following from the *Texas Sanitarian* contains a valuable hint not only for those who go abroad for "climate," but for those who stay at home. Life in the open air and "roughing it," with proper diet and clothing to suit the atmospheric conditions, are much more valuable than medicine:

> On the 15th of last December a gentleman from Missouri brought his son, aged nineteen, to Austin, with well marked incipient consumption. Instead of stopping at a hotel or boarding house which he was amply able to do, he purchased a comfortable tent on the mountain side, near the great dam on the Colorado river, three miles above the city, and began a camp life under the advice of some sensible physician at his home. Here he and his son "roughed it" in such weather as came. They did their own cooking, spending most of their time in the open air, fishing, hunting, rowing on the lake, and exploring the wild country around them. When they wanted a steak, some vegetables, fruit, or anything from the city, they simply crossed the river in their boat, boarded the "dummy line" (now electric cars) and came down for it, but they lived largely on the game, squirrels, birds, rabbits, fish, etc., which abound in the neighborhood of their tent. On the first of February, just one and a half months from the day they took up their tent life, the father told the writer that his son had gained twelve pounds, and was able to lead him in climbing, rowing and eating.
>
> The above is a practical demonstration of the value of tent life in the proper climate for those suffering with incipient tuberculosis.

In a sanitary convention held in Los Angeles, a discussion on house ventilation and the open air treatment of consumptives led Dr. Norman Bridge of that city to say:

> "A person will not take cold by reason of cold air or moving air, provided his body is warm at all times; and, therefore, a patient may sleep in a tent, or under a wagon, or in a room with windows on nearly all sides, and windows wide open, and he may feel the current of air over his face every moment he is awake during the night, yet he will never take cold, provided his body is warm, and any person who has any considerable proportion of the normal vitality of the human body may keep his body warm

by clothing it in wool. Therefore, one of the first steps for the profession to take, I am sure, is to convince the sick, certainly, and the well so far as possible, that in a country like this, where there is such a difference in the temperature of the day and the night air, and where so few houses are warmed in the night, that people should wear woolen night-gowns, and, if necessary, in the Winter time, should sleep between woolen blankets instead of cotton sheets; and, if necessary to protect the head, particularly if it is bald, from sensations of a draught, they should wear woolen night-caps. If they will do this they may be told, without any danger of a mistake, without any danger of accident, without any danger of their demonstrating that we are wrong, that they will not take cold, that they cannot take cold to save their blessed lives, if they will do these things. If we could do this for the sick we would remove one of those obstacles, I am sure, to good ventilation for sleeping-rooms. These people with the miserable rooms they have, therefore, may have good ventilation when they are asleep. There is no difficulty about it at all. They have to be convinced, however. They won't believe this at first, but a reasonable patient will nearly always believe it. I have had a good many dozens of patients in the last five years here, who not only have believed it, but also have demonstrated it, and I will relate the experience of one of them—a tuberculous patient, who lives at Redlands. He was very much surprised when told that he could sleep in the open room, and that he had better sleep in a tent; that he might feel a current of air over his face without taking cold. He said he would try that, simply to see whether it was true or not, if for no other purpose. A year ago last Fall he went back to his home from his vacation at the sea side, and constructed a tent on the veranda of his house, that was twenty feet long and about five or six feet wide; and he put his bed in there, and slept in it all Winter, sleeping in woolen blankets and woolen night-gown, and a woolen night-cap over his head. The wind blew out one end of the tent and he never replaced it, but put his bed up to the other end, and let the wind blow and the rain come. He never caught cold, and he came down to me last year, as ruddy and vigorous looking as any person in Southern California or any other place in the world, declaring that he had not only not taken cold, but also had a very enjoyable time. Similar experiences have come to a large number of patients, but certainly only a few have made so severe a test as this man did. I am positive that this bugbear of a current of air endangering life to a person asleep, even if he is warm, is one of the greatest obstacles to a restoration of health, and one of the greatest obstacles to the keeping of health on the part of well people in this part of the country."

COMMUNICATED FROM HUSBAND TO WIFE.

That tuberculosis is contagious is established beyond controversy. The observation of nearly every physician evidences numerous instances where the communication of the disease was from the patient having been the constant companion or bedfellow of a consumptive person.

Clapp, in "*Is Consumption Contagious?*" cites twenty cases where wives were contagioned by their husbands, and thirteen where husbands were contagioned by their wives. Among these were:

Louise D., born in the department of Aveyron, France, in 1866. Her parents and their parents were noted for longevity. She had eleven brothers and sisters, all of whom inherited the vigorous constitution notable in the family. At twenty-six she married a young man whose parents had died of consumption. A year following the marriage, he developed all the symptoms of consumption. The disease progressed to a fatal termination. The young wife, not wishing to add to the sufferer's uneasiness, and contrary to the advice of the physician, shared his bed until his decease.

She again married a consumptive, and the third year after this marriage her health began to fail, and three months later she died.

Bergeret reports the case of a man who was very stout, whose parents were both octogenarians, with broad chests and all the attributes of a powerful organization. Her husband died from consumption. She cared for her husband faithfully to the last, sleeping in the same room and seldom leaving him. Three years after her husband's death she died of the same disease, having suffered a long time.

Hermann Weber reports, in 1874, *Clinical Society's Transactions*, Vol. VII, the case of J, whose mother, two brothers and a sister died of consumption. He married four women, all of whom died of consumption, he following soon after the death of the fourth wife. At their marriage all the women were healthy and robust.

Weber also reports, *loc cit.*, the case of W, who belonged to a consumptive family, having lost his father and two sisters by that disease. He married three women, all belonging to robust families. Each died of consumption, and he soon followed the third wife.

Dr. S. D. Burgess, in *Transactions of Southern Illinois Medical Association*, 1879, reports the case of Mr. H. H., of consumptive lineage, and in the incipient stage of the disease married a woman of a remarkably healthy family, and noted for longevity. Eighteen months after marriage he died. Twelve months after his death the wife died of the same disease, having nursed her husband during his illness. The wife was nursed by a single sister, who died of the same disease eighteen months after the wife. This single sister was faithfully nursed by a brother, and he also died of the same disease. The remainder of the wife's family lived at a distance, seldom visiting her, so that they escaped the contagion, not one of them ever manifesting any indication of the disease.

Dr. E. D. Kittoe, of Galena, Ill., in *American Journal of Medical Sciences*, 1878, page one hundred and forty-five, reports the case of the late Gen. J. A. R., whose parents were both remarkably robust and healthy, no taint of tubercular disease having been known to affect the ancestors of either the father or mother. The General was a remarkably strong and vigorous man. He married a woman who came of a consumptive family and in whom the disease developed soon after marriage. The General gave himself up almost entirely to nursing her, staying often in a close room with her up to her death. At the close of the war he was in a well-defined tubercular condition, and gradually gave way until he died. Three years before his death he married a woman, none of whose family had any tendency to consumption, yet she died of the disease eighteen months after the decease of the General.

The following letter received by the Secretary from an intelligent gentleman in Iowa details a family history that is not only sad but strikingly illustrates the fact of the infectiousness of consumption. How natural for the mother, after nursing two daughters with the disease, to succumb herself, and for the father and husband to follow!

........................, Iowa, September 22, 1897.

Dr. Kennedy:

DEAR SIR—I have a chance to rent a good house here but it has the following drawbacks: The family that formerly lived in it died there as follows: *A daughter in 1888; another in 1890: the mother in 1893, and the father thirty days ago, all of consumption.*

It is a desirable property and will be repapered and painted throughout. In addition to this if each room was thoroughly disinfected, the floors cleansed thoroughly and treated to a coat of carbolic acid solution, do you think there would be any danger whatever in occupying the house?

An early reply will oblige, ...

The Secretary replied as follows:

MY DEAR SIR—I do not think there would be any danger under the conditions you speak of. If all particles of dust and dried sputum are removed or thoroughly disinfected there can be no danger

You should, in addition, ventilate all you can. Keep the house well open and let in plenty of fresh air and sunshine.

The presumption is that the house itself has a good healthy location.

Murrell, in *Lancet*, April 10, 1897, reports a case of a man apparently robust and in perfect health, who married a woman of like physical condition. Her family history gave no taint of consumption. His father and sister died of that disease. Soon after marriage he sickened and died of consumption. His wife during the last seven months of his life nursed him incessantly. Soon after his death she sickened and died of the same disease.

Dr. Hermann Weber gives details of thirty-nine wives who were contagioned by consumptive husbands.

Instances by the thousand like the preceding can be cited showing the communicability of this disease, and the importance of the adoption of all possible measures to avoid the contagion.

The records show that more women than men fall before this disease. The reason is, because they are more exposed. As in war, more men than women are killed, because the former are more exposed. The wife is the natural nurse of the sick husband, and ministers to his wants day and night for weeks, months—it may be years, with total disregard of self.

Per contra, if it be the wife who is ill, the husband, who is the bread winner, commits the invalid wife largely to the care of others, so that he is away from the house more or less, and thus escapes the close and constant exposure.

The contagium however, is no respecter of sex.

TUBERCULOSIS IN THE SCHOOL ROOM.

The following letter from an intelligent and experienced physician in Iowa is from a practical standpoint and forcibly illustrates, as well as emphasizes, a source of danger too often overlooked:

.........., Iowa, March 2, 1897.

J. F. Kennedy, M. D.:

DEAR DOCTOR—Permit me to invite your attention, and that of the State Board, to a matter that seems to have attracted no attention among physicians and educators. The only articles I have noticed in print were those over my own signature. I refer to the very dangerous habit of school teachers spitting on the floor in school rooms. It is not an uncommon practice in our country schools for teachers to habitually spit on the floor and then rub it down with the foot. I have known teachers to practice this daily who were then suffering from tuberculosis and died subsequently from its ravages. These persons (otherwise good teachers) did, of course, deposit millions of the tubercle bacilli upon the floor to dry and be inhaled by the pupils

Have we not all treated cases of consumption contracted, beyond a doubt, in the school room?

While the teacher will positively forbid the boys to chew tobacco and spit upon the floor, she will daily deposit her disease germs within easy reach of the pupil's nose and mouth, and permit tuberculous pupils to do the same thing.

While the mention of this fact would astonish some of our legislators, it is certainly a matter of very serious import. Should not the State Board take the subject in hand?

I would suggest that no person be granted a certificate as teacher in our public schools who is not pronounced free from tuberculosis by a competent medical board; that it be made a penal offense for any one to spit on the floor of school room or church, and that disinfected spittoons be provided. If you can bring about such legislation your name will go down in history as a benefactor of the race. Yours truly,

...................., M. D.

TYPHOID FEVER.

Typhoid fever, which was generally prevalent over the State during the first year of the biennial period, subsided very largely during the second year. The reason may be found in the increased rainfall, by which streams, wells, and sources of water supply were replenished, and the contamination thereof largely removed.

Typhoid fever is an endemic, infectious disease occurring in nearly all parts of the world. It occurs most frequently in persons under thirty years of age; oftener in males than females; and at all seasons of the year.

The microbe, or germ of the disease is communicated to the individual by the imbibition of water, milk, and other articles of food and drink. The bacillus finds lodgment in the intestinal canal, where it multiplies and produces the peculiar morbific effect.

The virus of the disease may be propagated among healthy persons:

1. By percolation through the soil into wells that supply drinking water;
2. By issuing through defective sewers or drains into the air of the inhabited area;
3. By exhalations from ill-trapped water closets or privies which are the receptacles of the discharges of the sick and the resort of the healthy.

The micro-organism is found in the excreta of the patient, and not in the air surrounding the patient; hence the air coming from contaminated cess-pools, water closets, etc., is more dangerous than that from the sick room.

Milk absorbs quickly the germs from the typhoid patient and can be easily contaminated by carrying the excrement through a room in which the milk is placed. Milk thus exposed is a prolific source of infection.

CAUSATION AND SPREAD OF TYPHOID FEVER.

From an elaborate report of Dr. George M. Grober, special medical sanitary inspector, upon his investigation of five hundred cases of typhoid fever, in the District of Columbia, in 1895, is taken the following conclusions as to the cause and spread of the disease:

All scientific physicians agree that typhoid fever is caused by an organized germ capable of reproducing itself within and without the body, instead of such hypothetical matter as miasms or contagia, whose nature has never been demonstrated to our senses. On no other theory, except the germ theory, can we explain the occurrence of typhoid fever epidemics spread through the water and milk supply. If we reject the germ theory, we will indeed be forced to the conclusion that fecal and putrescible matter when present in milk or water in infinitesimal dilutions is capable of producing the disease in question. "A poison may produce sickness and even cause death, but it cannot infect, because it cannot reproduce itself."

According to the advocates of the germ theory, a certain number of typhoid bacilli gain admission, we will say, into the intestinal tract, and, if the conditions are favorable, begin to proliferate. It has been estimated that a single germ by growth and subdivision is capable of producing over sixteen millions of similar germs in twenty-four hours. In consequence of their own life's process they produce a soluble poison which, when absorbed, gives rise to constitutional symptoms, and in addition also acts as a local irritant and causes the lesions in the alimentary canal, characterized usually in the first week by infiltration, in the second week by ulceration, and in the third week by separation of the sloughs.

The intensity of the local and general symptoms doubtless depends not only upon the dose of the fever-producing agent, but also upon the individual susceptibility, or rather the aptitude, of the organism to feel the effects of the poison evolved by the germs. In this way we get our mild, medium, severe, or irregular types of enteric fever, differing simply in degree but not in kind.

A mild infection may give rise to abdominal catarrh, with symptoms of catarrhal jaundice, and temperature not exceeding one hundred degrees. Many of such cases have been observed, in which there was enlargement of the spleen, with the characteristic eruption.

Again, there are cases, though quite infrequent in the United States, which have been described as the abortive form, in which somewhere between the seventh and fourteenth day, as Jaccoud expresses it, "the sickness takes a sudden turn and runs a course similar, as regards enteric fever, to that which varioloid runs as regards variola." Griesinger reports a case where the duration did not exceed five days.

Such cases can only be explained by assuming that the intestinal lesions undergo resolution, and that we simply have to deal with the primary fever and not with the secondary or septic fever due to the ulcerations and formation of sloughs.

CHANNELS OF INVASION AND MODES OF DISSEMINATION.

The invasion of the microbe most likely takes place through the alimentary tract. as evidenced by the primary intestinal lesion and the frequent dissemination of the disease through the water and milk supply. The possibility of transmission of the virus through the air should not be excluded, for, as in tuberculosis so in this disease, the infectious material may have become dried and pulverized and with particles of dust gain access to food or into the mouth, there to be swallowed or inhaled.

The principal source of transmission of the microbe, however, is through the water supply, infected milk and food, and there is much reason for believing that in such cases the virus proceeded from the dejecta of typhoid patients which gained access to the water supply directly or through the soil, or the wash water from patients and infected clothing and bedding, or found its way into vegetables and fruits, which are eaten raw, through the medium of fertilizers or washing them in infected water.

The agency of flies and other insects in carrying the germs from box privies and other receptacles for typhoid stools to the food supply cannot be ignored.

MILK INFECTIONS.

Dr. Busey and myself have tabulated one hundred and thirty epidemics of typhoid fever from all parts of the world, which were traced to contaminated milk.

In one hundred and nine instances there is evidence of the disease having prevailed at the farm or dairy.

In fifty-four the poison reached the milk by soakage of the germs into the well water with which the utensils were washed; in fourteen of these the intentional dilution with polluted water is admitted.

In six instances the infection is attributed to the cows wading in sewage-polluted water. In three instances the infection was spread in ice cream prepared in infected premises. .In twenty-one instances the dairy employés also acted as nurses. In six instances the patients while suffering from a mild attack of enteric fever or during the first week or ten days of their illness continued at work, and those who are familiar with the personal habits of the average dairy boy will have no difficulty in surmising the manner of direct digital infection. In one instance the milk tins were washed with the same dish cloth used among the fever patients.

WATER-BORNE EPIDEMICS.

We have the experience of Plymouth to show that the excreta of a single typhoid patient washed into a stream caused over one thousand cases of this fever. A study of the epidemic at Cumberland, Md., 1889-'90, indicates that typhoid fever was not present until the discharges from a case living on one of the little runs which empties into the Potomac about two hundred feet above the pumping station found their way into the city water supply, Such instances could be recited by the hundreds.

INFECTED SELTZER WATER.

Helwig reports an outbreak at Mayence in 1884, which was traced to the use of artificial seltzer water, the water having been obtained from a well polluted with typhoid dejecta.

INFECTED WELLS.

Breumer presents the medical history of a farm, showing for twenty-four years the occurrence of typhoid fever, sometimes amounting to an epidemic. During a similar outbreak in 1886 he examined the drinking water, which, though clear and odorless, contained twenty thousand germs per teaspoonful, among others fecal or intestinal bacteria.

An outbreak of typhoid fever at Hirschfelden in 1885 was limited to persons using the water from a well in the vicinity of which the mother of a typhoid patient had been washing the soiled linen and bedding of her son.

INFECTED CLOTHING.

Gelau reports an epidemic which renders it probable that the disease may be communicated by means of infected clothing. A German army regiment, with an average mean strength of three hundred and fifty-three men, between the years of 18 3 and 1884, furnished not less than one hundred and forty-six cases of typhoid fever. The water supply was above suspicion, and disinfection of the quarters and even abandonment of the barracks failed to check the disease. This finally led to the suspicion that the clothing might be the source of infection, especially as the garments were promiscuously worn. Examination revealed the presence of fecal spots in a number of pantaloons. The clothing was disinfected, after which only three mild cases appeared, and these were confined to the men engaged in the disinfection.

INFECTED HANDS.

There are of course a number of instances on record in which the disease was contracted by washerwomen, nurses, and persons engaged in the removal of night soil containing typhoid stools, and the most probable explanation is that in the majority of these cases the virus was conveyed to the mouth by means of infected fingers.

Professor Finkler, of Bonn, a very competent observer, believes that the disease may be communicated by intimate contact, living in the same room, or breathing the same air, and accounts in this way for a number of outbreaks in his section. In 1886 a woman who had been called to one hamlet to nurse her children returned to her home, was taken sick with typhoid fever and communicated the disease to her nurse, and subsequently fifty other cases developed which could not be traced to soil pollution or infected water supply. From this locality three children were admitted to the hospital at Bonn; here four persons were attacked who had come in direct contact, and five washerwomen who had come into indirect contact, *i. e.*, through the clothing and linen of the patients. I have found similar instances in my present investigation, but it is practically impossible to say whether in these cases the germs were conveyed through the fingers or through the air, or by means of flies infecting the food. Pfuhl, a German military surgeon, has recorded an observation which renders it probable that typhoid fever may be contracted by bathing in polluted streams.

RELATION TO WATER SUPPLY.

The death rate of a community may fairly be taken as an indication of the character of the water supply. It is true typhoid epidemics have been traced to other sources than water, but observation and experience have demonstrated that contaminated and polluted water is the most prolific cause.

In cities provided with good systems of sewers and pure water, epidemics of typhoid fever are quite rare.

"Perhaps no more impressive illustration of the effectiveness of pure water can be given," says Thomas B. Carpenter,* "than the remarkable cholera epidemic in Hamburg in 1892, which so startled the civilized world, and the comparative freedom of Altona from the disease. Both cities are in close proximity to each other. In fact they merge one into the other, and no boundary exists. Both empty their sewage into the Elbe and both draw their water from the same stream, Hamburg taking it from a point above both cities and Altona below. During August, 1892, a band of Russian gypsies encamped on the banks of the Elbe and the excrement of one of its members, subsequently found suffering from cholera, was emptied into the river. There speedily followed an epidemic of the disease in Hamburg, with a total number of cases of seven thousand four hundred and twenty-seven and nine thousand three hundred and twenty-one in August and September, respectively. During the epidemic there occcurred seventeen thousand and twenty cases with eight thousand six hundred and five deaths. Hamburg delivered water to its inhabitants with practically no purification, followed by the above disastrous results. Altona, although deriving its supply from the same river, and immediately below both cities, after receiving the sewage of almost eight hundred thousand people, escaped the epidemic with but comparatively few cases, and these were largely imported. Needless to say Altona filtered its water before delivery.

In 1893 a filter plant was installed in Hamburg, and the death rate from typhoid fever, which in 1894, when the source

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*Bacteriologist of Department of Health, Buffalo, N. Y., in *Albany Medical Annals*, April, 1897, p. 149.

of water supply was the same as in 1892, was $21\frac{8}{10}$, was reduced to six per one hundred thousand in 1894."

The following table given in the *Albany Medical Annals*, April, 1897, shows the influence of proper methods of water purification upon the death rate from typhoid fever:

CITIES.	Typhoid mortality 1890 to 1894, inclusive, per 100,000.	WATER SUPPLY.
The Hague	4·9	Filtered from sand dunes.
Rotterdam	5·2	Filtered from River Maas.
Christiana	6·8	
Dresden	6·9	Filter gallery, River Elbe.
Vienna	7·	Springs in the Schneeburg.
Munich	7·1	Springs, Mangfall valley.
Copenhagen	7·9	
Berlin	8·	Filtered, Lake Tegel and River Spree.
Breslau	11·6	Filtered from River Oder.
Amsterdam	13·9	Filtered from Haarlaem Dunes.
Stockholm	14·3	
Brisbane	14·3	
London	14·6	Kent wells, filtered from Thames and Lea.
Edinburgh	15·8	Filtered from reservoir in Pentland hills.
Trieste	17·	
Brooklyn	19·	Impounded and wells.
Des Moines	20·2	Gallery system, natural filtration.
New York	20·4	Inpounded from Croton and Bronx rivers.
Davenport, Ia	21·4 (1895–26)	Mechanical filtration from Mississippi.
New Orleans	21·4	Rain water from tanks and cisterns.
Sydney	21·6	Impounded from upper Nepeau.
Hamburg	21·8 (1895–6)	River Elbe (filtered since May, 1893).
Budapest	22·4	Ground water from wells.
Glasgow	22·8	Lake Katrine.
Brussels	26·2	
Paris	26·4	Rivers Seine, Marne, Vanne and Ourcq canal, wells, etc.
Manchester	27·6	Lake Thirlmere.
Venice	30·2	
Milwaukee	32·	Lake Michigan.
Rome	32·2	Fontanadi Trevi, Acqua Felice and Paoli.
Boston	32·6	Lake Cochituate and Sudbury rivers.
Detroit	33·8	Detroit river.
Dayton	36·	Driven wells.
Turin	36·8	
Liverpool	37·	Lake Vyrnwy.
Buffalo	39·2	Niagara river.
Providence	39·2	Pawtuxet river.
Covington	39·4	Ohio river.
San Francisco	40·2	
Prague	43·2	
Minneapolis	45·4	Mississippi river.
Baltimore	45·8	Lake Roland and Gunpowder river.
Newark	45·8	Inpounded from Pequannock river since April, 1892.
St. Louis	47·	Mississippi river.

CITIES.	Typhoid mortality 1890 to 1894, inclusive, per 100,000.	WATER SUPPUY.
Newport, Ky	47·5	Ohio river.
Philadelphia	48·2	Delaware and Schuylkill rivers.
Denver	48·3	South Platte river.
Cleveland	49·2	Lake Erie.
St. Petersburgh	52·3	Filtered from River Neva.
Cincinnati	52·4	Ohio river.
Moscow	57·	Springs ponds, Moscov and Yanzi rivers.
Toronto	57·8	Lake Ontario.
Quincy, Ill	58·	Mechanical filtration from the Mississippi river.
Dublin	58·8	Filtered from River Vartry.
Knoxville	61·9 (1895–59)	Mechanical filtration from Tennessee river.
Milan	62·	Passaic river.
Jersey City	75·	
Washington	76·6	Potomac river.
Louisville	79·4	Ohio river.
Chattanooga	80· (1895–48)	Tennessee river.
Chicago	84·	Lake Michigan.
Pittsburg	91·7	Allegheny river.
Lowell	92·4	Driven wells and Merrimac river.
Atlanta	92·8 (1895–43)	Mechanical filtration from Chattahoochee river.
Lawrence	96·2 (1895–48)	Natural filtration from Merrimac river since 1893.
Alexandria	162·4	Nile.
Cairo	189·4	Nile.

It is very noticeable that those cities having pure water supplies, Munich and Vienna, from mountain springs; Frankfort, Copenhagen, Dresden, from ground water; The Hague, Berlin, Rotterdam, Breslau, Hamburg, Zurich, London, whose waters are filtered, even though in some cases the raw waters are badly sewage-polluted, have very low death rates from typhoid fever.

Another noticeable feature of this report is the difference in mechanical and natural filtration. Davenport and Quincy get their water from the Mississippi, not many miles apart. Des Moines has the gallery system and natural filtration. Its actual annual death rate for the period given was 16$\frac{3}{10}$, representing a population of 75,000.

An interesting instance of the effect of the purification of the water supply is shown in the cases of Jersey City and Newark, N. J. These two cities are practically under the same climatic and geographical conditions, being separated by the Jersey Meadows. Previous to April 15, 1893, both Jersey City and Newark took their water from the Passaic river, into which goes a great quantity of sewage. Up to that time the annual death rates from typhoid fever were as follows:

	1890.	1891.	1892.
Jersey City	9 1/10	9 5/10	5 3/10
Newark	6	8 1/10	4 5/10

In April, 1893, Newark began using Pequannock water from a water-shed unexposed to pollution, while Jersey City continued to use the Passaic water. A diminution in the death rate from typhoid fever to one-fifth of its former proportions took place in Newark, as shown below:

	1893.	1894.
Jersey City	6	7 8/10
Newark	2 8/10	1 5/10

Pertinent to the foregoing table, which offers much for careful consideration, is a paper by James H. Fuertes, Civil and Sanitary Engineer of New York City, prepared for the Civil Engineers' Association of Cornell University, 1896, giving the sources of water supply of the leading cities named in the table:

"It is possible, in a general way, to see that in those cities whose waters are polluted to greater or lesser degrees the typhoid death rates increase directly with the degree of pollution. For instance, in those using the raw river waters which flow through populous districts the death rate is uniformly higher than that of any other class, modified only by external influences, such as in the case of New Orleans, where the river is of enormous volume, carries large quantities of silt that aids sedimentation, and flows through an almost uninhabitated territory for many leagues above the city. So much for statistics. Now it will be interesting to see where a few of the large cities of Europe with which travelers are most acquainted obtain their drinking water.

SOURCES OF WATER SUPPLY OF SEVERAL LARGE EUROPEAN CITIES.

Amsterdam drinks water collected in open canals of a total length of about fifteen miles, cut through the sand dunes. The iron which is dissolved in the water is deposited in the canals and the water is then again filtered before delivering it to the city. The typhoid fever death rate at Amsterdam is about twelve per hundred thousand per year.

Antwerp is supplied with water filtered from the tidal river Nethe, which is at times polluted by the sewage of Brussels and that of other small cities. Owing to its origin and to the muddy banks of the stream it is quite turbid and stained and of a disagreeable taste. The objectionable qualities are all removed by treatment with metallic iron in Anderson's Revolver Purifiers and a subsequent filtration. This process, which s closely watched by the city authorities, is said to be efficient.

Berlin and its suburbs have many water supplies, but all are so treated s to bring them practically to the same standard of purity. Some come rom ground water and some from the Rivers Spree and Havel. All the water is filtered. The water that is furnished to the suburbs of West End, Charlottenburg, Schoeneberg, Friedenau, Steglitz, Wilmersdorf, Schmargendorf, Kolonie, Gruenewald, Zehlendorf, Wannsee, Halensee, Grand Lichterfelde, Suedende, Lankwitz, Tempelhof and Rixdorf, with a total population of two hundred and twenty thousand, is obtained exclusively from ground water from two plants, the Wannsee works and the Teufelsee works in the Gruenewald. This water contains iron in solution, which is removed by letting it fall through seives on a bed of coke, and then, to remove danger of other pollution, it is all filtered through sand filters before being sent to the city.

The suburbs of Lichtenberg-Freidrichsberg, Boxhagen-Rummelsberg, and Freidrichsfelde, on the east side of Berlin, with a population of about fifty thousand, are supplied with ground water from the southeast of Friedrichsfelde, treated similarly to that above described. The first water works which supplied Berlin, outside the Stralauer Thor, were opened in 1856 but are not now in use. The present supply of the city proper is furnished from two works, those on the Tegelsee, to the northwest of Berlin, an enlargement of the River Havel, which supplies one-third of the water to the city, and those on the Mueggelsee to the southeast, which supplies two-thirds of the water. At each one of these the water is taken from the lakes directly, filtered and pumped to large reservoirs, from which it is again pumped to the distributing pipes. The quality of the water is excellent, and the health records of the city show that the typhoid fever death rate in recent y ears has been very low, and was only four per hundred thousand in 1894.

Brussels, the beautiful capital of Belgium, with two hundred thousand inhabitants, uses water from a system of conduits nearly five miles long, which are a hundred feet below the surface of the ground, under a forest used for a city park. The suburbs, however, are not so well supplied; and serious studies are being made in view of the demands of the probable "greater Brussels" of the near future. The plans presented favor either an extension of their present system in another locality, or the securing of a new supply of water from a more distant source.

The water which is supplied to Copenhagen is drawn from the ground by driven wells over a large territory lying principally to the northwest of the city. The death rate from typhoid fever in the city is about seven per hundred thousand inhabitants per year.

Dresden, the art center of Germany, has very good water, derived from an underground supply along the banks of the Elbe to the west of the city. The water comes from the Stadtwald, a large uninhabited forest on a hill, owned by the city. It percolates through the ground and finds its way finally to the banks of the Elbe, where it is collected by a line of perforated pipe nearly a mile long and pumped to the city reservoir. Since the present supply is not as large as they need, they are about to build another set of works further up the river, upon the same principle, but with slightly different details. The excellent quality of the water is attested by the low death rate of seven per hundred thousand per year from typhoid fever.

The water used in Edinburgh is brought from the Moorfoot and Pentland Hills and is filtered before delivering it to the city pipes to remove the discoloration it acquires from the vegetation on the gathering grounds. As the supply from these sources is nearly taxed to its utmost to supply the growing city, they are constructing an additional supply that will be brought from the Talla, a branch at the head waters of the River Tweed, thirty-two miles from the city. The water of Edinburgh is very soft and of an excellent quality.

Frankfort-on-the-Main gets its water partly from springs, and partly from ground water which is collected under a large primeval and uninhabited forest owned by the city. It is on the Sachsenhausen side of the Main, opposite Frankfort, near Schwanheim. The permanent level of the ground water is about fifteen feet above the river at the works, so that there is no possibility of contamination. The water for street sprinkling is taken from the river and is entirely separate from the drinking water. The death rate in Frankfort from typhoid fever in recent years has been about six per hundred thousand per year.

Geneva, Switzerland, in Roman times, and in the middle ages, was supplied by aqueducts which brought spring water from the hills and mountains. Traces of these aqueducts still exist; but the supply is now drawn from the Lake of Geneva, at a point outside the harbor, about fourteen hundred feet from the shore, and forced into the city, both for domestic use and for power for manufacturing purposes. Large pumps actuated by turbine wheels, are driven by the dammed up water of the Rhone as it issues from the foot of the lake, to perform this service. The waste waters from the city are prevented from going into the lake by large sewers built along the banks of the river and of the lake, which intercept the foul waters and discharge them into the Rhone below the pumping-station. During the summer season one of the attractions of this beautiful place is the fountain of the water works, a single jet of water thrown vertically from a large nozzle in the harbor to a height of about two hundred feet. In the evening it is illuminated by colored lights refracted through the stream, which makes it stand out in bold relief and brilliant colors against the dark background.

Genoa is provided with water by three aqueducts, which bring the waters of small mountain streams to the city, and like all supplies derived from surface gathering grounds, are, most of the time, very good; but are subject to pollution if not given the most intelligent supervision and watchfulness. The cholera* of 1884 in Genoa was attributed to the infection of the waters of the Scrivia, which supples the Nicolay aqueduct through filter galleries, by the throwing of the wash water of the linen of choleraic patients in the small hamlet of Busalla, into a tributary of the Scrivia, through which it found its way into the city. Cholera appeared in Genoa six days after the pollution of the water.

Glasgow uses the waters of Loch Katrine in the highlands thirty miles away, which are brought to the city in two aqeducts. The city secures the lake against pollution by having entered into agreements with the proprietors of the lands adjoining, whereby it may at any time, if it be deemed necessary, construct such works as shall protect the lake against pollution, which works shall be maintained at the proprietor's expense; and they have also held them under bonds not to construct nor allow the construction of any more houses in the water shed of the lake, nor to rent the land for building purposes.

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*Spataro "Igiene delle Acque," 1891, page 70.

Hamburg is now supplied with the filtered water of the Elbe. The filters have been completed since the epidemic of cholera in 1892. They were put in operation in May, 1893. Examinations are made constantly of the water as it goes to the city from each filter, and the closest possible watch is kept over the result. When it is realized that there are on the Elbe, many large cities above Hamburg, which discharge their sewage into it, with an aggregate population of over six million people, and that at Hamburg it is subject to tidal influences, the exceedingly low death rate from typhoid fever of six per hundred thousand in 1894, after the filters were put in operation, is an indication at least of a decided change for the better, since previous to that time the rate for several years had been in the neighborhood of twenty-eight

Heidelberg has very good water from two sources. The old supply comes from two springs, the Wolfsbrunnenquelle, developed in 1873, and the Rombachquellen, developed in 1876. Several years later, a driven well about one hundred and fifty-seven feet deep, was put down a quarter of a mile above the Marktplatz in the valley of the Neckar, which yields water of the same quality as the spring water.

Leipsig uses ground water collected in perforated pipes driven about thirty-five feet deep into the gravel subsoil in Staatswalde, near Naunhof.

Liverpool goes into the heart of Wales for its main supply, by throwing an enormous masonry dam across the valley of the Vyrnwy river, thus forming a lake eighty-four feet in depth at the deepest place. The water is yellow, as are many of the surface waters of England, but it is filtered at Oswestry, nineteen miles from the dam, which operation removes the greater part of the discoloration. In addition to this supply, they have wells sunk into the new Red Sandstone, with reservoirs and filter beds at Rivington, about twenty miles from Liverpool, and fifteen from Manchester.

London with a population of nearly six million gets its water from many sources, and in 1890, distributed to the people not less than seventy-seven billion eighty-six million gallons of water. To give a concrete idea of what this enormous quantity means, one must imagine that it would be sufficient to fill a reservoir that would cover a whole congressional township, or thirty-six square miles to a depth of eleven feet. Scarcely half of this supply is taken from the Thames, about thirty-eight per cent comes from the Lea, and the remainder from springs and wells. All the water which is drawn from the river is filtered, and special supervision is given by the Conservancy Boards over the sewage disposals methods of the various towns in the water shed of the river, to prevent pollution. The typhoid fever death rate of the district supplied with the well water and of those supplied with filtered river water, is to-day about the same and averages about fourteen per hundred thousand per year.

Manchester is supplied by surface water from two sources. The old supply from the Longdendale Impounding reservoirs, about fourteen miles east of the city, and the new supply, which is brought in an aqueduct seven feet in diameter from Lake Thirlmere in Cumberland county, ninety-five miles north of Manchester. Previous to the introduction of the Thirlmere supply the typhoid fever death rate for four years had been nearly constant and in the neighborhood of thirty per hundred thousand per year. In 1894, the Thirlmere water was introduced and the typhoid death rate for that year is given at eighteen per hundred thousand. To protect the purity of the water, Manchester has, at great expense, purchased absolutely, the whole area of the tributary water shed.

Marseilles, on the Mediterranean Sea, is supplied by an aqueduct taking its water from the River Durance. The work was undertaken in 1837 and finished in 1848, under the direction of the Engineer Montricher. The source is near the Suspension Bridge of Pertuis, on the Durance, about fifty-two miles from Marseilles. At the point where the line of the aqueduct reaches the valley of the Arc it crosses on a masonry structure of great beauty, called the Aqueduct de Roquefavour. It is about a quarter of a mile long and two hundred and seventy feet high above the waters of the river. It presents the appearance of three bridges, one above the other, like the Pont du Gard, the ancient Roman aqueduct of Nimes, ascribed to Agrippa 19 B. C., but it is very much higher and longer than the latter. On reaching Marseilles the water flows into a large reservoir, which is arched over and covered several feet deep with earth, shrubs and tropical plants. The front of the reservoir exhibits a magnificent fountain under the arch between the two wings of the Palais de Longchamp. One of the most serious defects in this copious water supply is that the aqueduct is open at the top in several places, and is thus made susceptible to pollution. In Marseilles, epidemics of intestinal diseases have been attributed to this fact [*]

Munich, like Vienna, is fed by springs from the foot of the mountains. Munich, more than any other large city in the world, has probably the best right to boast of her water supply, for not many years ago it was the seat of frequent fearful epidemics of typhoid fever and other diseases, while owing to sanitary improvements the typhoid death rate in 1894 was only two and a half per hundred thousand per year.

The springs, of which there are many, are developed by making tunnels under the gravel hills that yield the water, and connecting them with an aqueduct that leads them to the city, thirty miles distant. The water which feeds the springs probably comes from the Tegernsee,[†] a lake in the foothills of the Alps, some miles distant, which slowly filters out through these gravel hills deposited by glaciers, and appears as springs in the Mangfall Thal. The water, however, is very hard. I was shown a stalactite, one-half inch thick, six inches wide and two feet long, which had formed in two years in one of the new tunnels. In this same valley there occurs a curious transformation which was brought about by the hardness of the water. A small spring, a great many years ago, was improved by a farmer by placing a wooden trough so that its waters could run to waste through it to a ditch The trough was made of a hollowed-out log. The lime in the hard water was gradually deposited on the log and the log gradually rotted away until now the wood has apparently entirely disappeared, and the water runs out of a stone log

Nuremberg also uses ground water taken from the fine sand underlying a valley about ten miles east of the city. The sand which bears the water is so exceedingly fine that ordinary perforated pipes driven into it would soon fill up with sand, and they were obliged to resort to an ingenious expedient to avoid this danger The method adopted was to sink first, at the point where the well was to be located, a thin sheet-iron cylinder, of several times the diameter of the tube which was to serve as a suction pipe. Inside of this large cylinder, at the bottom of the hole, they placed a concrete sole piece, entirely filling the cylinder at the bottom. Then inside of this cylinder they placed several smaller ones, each one within another, and all resting on the sole piece in the bottom The central cylinder is the perforated suction pipe connected with the pumps. In the annular spaces between these different cylinders were placed different sizes of sand and gravel, having the finest sand on the outside spaces, and then the coarser ones successively toward the center. The sheet-iron cylinders were then withdrawn.

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[*] Association Francaise pour l'Avancement des Sciences, September 1891, Marseilles.

[†] Mitteilungen ueber die Wasserversorgung Münchens—Oarl Pevc., Munich, 1895.

Paris has several water supplies for different purposes and from different sources. That which its two and a half million people drink comes from springs, of which the Moulin de la Source, the headwaters of the Dhuis, and Le Bime de Cerilly, in the valley of the Vanne, are the principal ones. These are very large and beautiful springs The Moulin de la Source yields daily about five million gallons, and Le Bime de Cerilley about half as much. The total quantity taken from the valley of the Vanne is about twenty to twenty-five million gallons per day. Besides these there are several artesian wells and springs which are in use and others are in course of preparation. Some of the suburbs, however, use river water. The typoid fever death rate of twenty-five per hundred thousand per year may, perhaps, be ascribed to the fact that the greater mortality rate amongst those using the river water may influence the rate of the entire city. As a recent plant for the purification of the river water used by certain suburbs has just been installed the results will be watched with interest.

No city of the world has been so famed in all ages for its water as Rome. Since 312 B. C. this city has been supplied with the water of springs and rivers and lakes brought within its walls from great distances. The Aqua Claudia, whose ruined arches stretch across the Campagna, has been the admiration of generation after generation since its completion in 52 A. D. by the Emperor Claudius. The waters, which for centuries it brought to Rome, were gathered from two springs in the Sabine mountains near the headwaters of the present Aqua Marcia. The course of this aqueduct to the city was circuitous, being forty-five miles in length, nine and a half of which were on arches across the Campagna.

The Aqua Marcia, which was built by Quintus Marcius Rex B. C. 144, was thirty-eight miles long, and brought its water from springs in the Vale d' Arsoli beyond Tivoli. In 1869 and '70 the sources of this ancient aqueduct, after having been lost for centuries, were rediscovered and the water brought to the city again by Pope Pius IX, most of the way in iron pipes, and known to-day under the name Aqua Pia.

The Aqua Virgine, which was built by Marcus Agrippa, 19 B. C., to supply his baths, the ruins of which are still to be seen against the back of the Pantheon, brings into the city daily about sixteen million gallons of water from springs in the Vale di Salone, fourteen miles away. The termination of this aqueduct is at the beautiful fountain of Trevi, whose water is drunk by travelers leaving Rome, in the hope that it will insure their return "some day."

The Aqua Felice, a restoration made in 1586 under Pope Sixtus V, of the ancient Aqua Alexandrina, built 226 A. D. by Severus Alexander to supply his extension of the baths of Nero, brings water from springs in the Alban mountains, about fourteen miles from Rome, between Gabii and Lake Regillus, and terminates in a fountain near the Piazza delle Terme.

The Aqua Paola was the ancient Aqua Trajana, built by Trajan in 110 A. D. and restored under Pope Paul V in 1611. Its termination is at the beautiful fountain on the Janiculum Hill, behind the church of San Pietro in Montorio, near the site of which St. Peter is said to have been crucified head downwards It brings the water from springs and from the Lago di Bracciano, more than thirty miles distant.

Southampton is supplied with water drawn from deep wells and galleries sunk in the clefted chalk formation near Otterbourne. The water as it is taken from the wells is very hard, about twenty degrees by Clark's scale, and before delivery to the city it is reduced to about six degrees by a treatment which removes the mineral compounds it has dissolved from the rocks.

Stuttgart is supplied with water partly from a spring called the Heidenklinge, but as it is rendered turbid by rains and melting snow in Winter they use a small filter at such times to clarify it. The rest of the supply is obtained from the filtered water of the river Neckar.

Venice was formerly supplied with rain water stored in cisterns, but in 1890 a system of water works was established near Castel Franco, about twenty-five miles from Venice, from which they now supply the city with ground water of a very good quality from deep wells. The yearly death rate from typhoid fever is about twenty-five per hundred thousand.

The water supply of Vienna, one of the purest in the world for a large city, is derived mainly from two large springs, the Kaiser Brunnen and Stixensteiner Quelle. The former is one of the most celebrated springs known. It lies in the Hoellenthal between Schneeberg and Raxalpe, above Hirschwang. Its waters are derived from the snow upon the greater part of the Schneeberg, which percolate through the porous and clefted rocks of the mountain, appearing here in a stream which ordinarily yields about two hundred gallons per second. With this beautiful water, fed by unpolluted snows, the death rate in Vienna from typhoid fever is about seven per hundred thousand persons per year.

At Zurich, drinking water is drawn from the Lake of Zurich, at a point quite out into the lake, and about thirty feet below the surface. It is then taken to the filters, of which there are seven in use and three new ones in construction, each about sixty feet wide and a hundred and twenty feet long, roofed over with concrete arches. The water is filtered through sand about three feet in depth and then pumped to a covered reservoir on a hill above the town for distribution to the city. The filters were first put in operation in 1886. For the six years before, the death rate from typhoid fever, which had been increasing, averaged sixty-nine per hundred thousand per year. For the six years after they were operating, it averaged about ten; this reduction, the authorities attribute to filtration.*

Many lessons can be learned from a study of these very brief descriptions if space would permit a digression into the different fields of inquiry. A few facts, however, may be commented on. In the first place, it is noticeable that most of the large European cities have spared no legitimate pains nor expense to secure uncontaminated supplies if possible. That when this has been impossible or impracticable for physical or financial reasons, they have spared neither pains nor expense to reduce the danger entailed from the use of such water as they could obtain. A comparative exhibit of the relative purity of untreated waters from different sources, as indicated by the typhoid fever death rates, seems to show, as our judgment would suggest, that the purest are those from springs and ground water in unpopulated districts whose sources are beyond the possibility of pollution: that the next in purity are the waters collected from large surface-gathering grounds, either in natural or artificial lakes, whose water sheds are protected against pollution as much as possible; that next come supplies from running streams where there may be a pollution at a distant point, the effect of which is modified by dilution and sedimentation, and that the most impure water supplies are those obtained from rivers or lakes whose waters are subject to pollution with the wastes of cities near the point where they are abstracted for use.

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*Licht und Wasserwerke Zurich, 1892.

But the most gratifying and important lesson is, that these statistics show that it is possible to take waters of the poorest quality and by intelligent treatment make them safe for use. These are not laboratory experiments made under theoretically perfect conditions. They are results actually obtained, often under adverse conditions, with large plants, in large cities, in different lands, among different peoples and under different climatic conditions.

It is well known that during the months of August, September and October typhoid fever prevails the most generally. The climatic condition of the preceding Summer has a notable effect upon the disease. This was demonstrated to a marked degree in the Autumn of 1892, when the disease was unusually prevalent over the entire country, the death rate being also very high, as a consequence of the preceding dry, hot Summer, when wells, rivers, lakes and streams were very low.

TYPHOID FEVER IN THE COUNTRY.

There are in the rural districts many cases of typhoid fever every year. A very probable source is in typhoid stools which have not been thoroughly disinfected, and deeply buried, but thrown upon the frozen earth in Winter, and in the following Spring washed into sources of water supply.

Blythe, in his *Manual of Public Health* (page 508), says: A constant series of cases of typhoid fever occurring regularly in the Autumn among children would indicate the infection of the soil; for, as is well known, children sit about upon the ground, continually have earth-soiled hands, and in this way contaminate their food."

LABORATORY DIAGNOSIS OF TYPHOID.*

While the method of making the Widal test for typhoid fever has been found to be necessarily more complicated than was at first supposed, nothing has been found to disprove its great value. As the discovery of the bacilli of tuberculosis has materially changed our views of consumption and, by rendering its recognition possible in its incipiency, placed it among the curable diseases, so the Widal reaction in typhoid fever shows a greater diversity in the manifestations of this disease than was formerly recognized. Cases are now classed as typhoid which in the absence of this test would not be so regarded. That typhoid fever can now be recognized when the clinical symptoms are insufficient to establish a diagnosis is a fact the value of which can hardly be overestimated, for it is the mild class of cases that are potent factors in the perpetuation and spread of the disease. While the early diagnosis of a case that would subsequently prove severe is of value to the physician in directing his treatment, the positive diagnosis of a mild case is of equal importance, as such restrictions can then be placed upon the patient as to prevent contamination which might give rise to other and more severe cases.

Every case of typhoid has its origin in some previous case which, through the media of food or drink, has brought about infection. It is therefore evident that any means which enables the physician to reach a positive diagnosis in a greater number of cases will at the same time be the means effectual in reducing the number of cases. We now have in the serum reaction a method of establishing a diagnosis in both mild and severe cases. Few physicians, however, are prepared to make the test, but as the quantity of blood required is small, and not impaired by drying, the examinations can be made and reports furnished by distant laboratories.

In collecting blood for this purpose the following simple directions are to be complied with: Cleanse the tip of patient's finger and puncture lightly with a sterilized needle, allow a few, five to ten, drops of blood to fall separately on an ordinary piece of glazed writing paper, allow to dry without heat, fold and mail in an ordinary letter. *No trace of antiseptic material of any kind should be on finger or needle in procuring the blood.*

Without entering into a detailed discussion of the laboratory technique, the examination may be briefly described as follows:

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*By Eli Grimes, M. D., Bacteriologist of the State Board of Health.

To a drop of dried blood is added a drop of bouillon and the two thoroughly mixed; a drop of this mixture is placed on a cover glass and a drop of bouillon culture of typhoid bacilli added. This is now examined as a hanging drop in a moist air cell under the miscroscope. If the bacilli show no cessation of motion nor agglutination the case is probably non-typhoid, and if another specimen be examined with the same result typhoid fever can safely be excluded from the diagnosis. But when the bacilli exhibit a marked decrease of motion with agglutination, the examination must be continued, as typhoid is strongly indicated but not established. The further examination now consists in making a series of dilutions of the blood and culture, and determining the highest dilution that will give a marked reaction. At the same time a parallel series of dilutions and examinations are made, using blood, similarly prepared and previously tested, obtained from a patient known to have typhoid fever. The object of this last named series of tests is to determine the sensitiveness of the bacilli used, and to obtain comparative results. In some instances blood of non-typhoid individuals give the reaction when in concentrated solution, but not when dilute. It is therefore necessary to exclude these cases by determining the degree of dilution which gives the observed reaction. By means of a Hemo-chronometer the amount of blood in solution is estimated with a sufficient degree of accuracy for this purpose. The reaction is most marked in blood taken when the temperature of the patient is the lowest. This is an important fact to keep in mind in procuring a specimen for examination.

HOG CHOLERA AND TYPHOID FEVER.

The following communication was addressed by Dr. Wright to Dr. J. I. Gibson, State Veterinary Surgeon, and was read by Dr. Gibson before the Board at its meeting held May, 1896.

The Secretary of the Board laid the facts before the meeting of the Iowa State Veterinary Association later, and suggested, as other cases somewhat similar had been reported, that in his opinion there were abundant reasons to believe that water polluted with the excreta of hogs having cholera might produce typhoid fever or some similar affection in the human subject if the water was drank without being properly sterilized.

Dr. Peters, of Nebraska, thought there was a marked difference between the germs of hog cholera and those of typhoid fever. Whether that is so or not, decency and safety dictate that such water should under no circumstances be used for potable or domestic purposes:

I was called Sunday evening, April 19, 1896, to visit the family of J. C., near Vail, Crawford county. Dr. Glynn, of Vail, had first seen them on the morning of that day.

The father had felt quite sick for more than a week. He was confined to bed on and after the 15th. Had no medicine until the 19th. From the 16th to the 18th four daughters became sick, and were obliged to remain in bed at home. Another daughter, who teaches school in Sac county, having been at home a week, on returning to Sac county, was taken sick at the same time as the others.

Dr. Glynn's record showed the temperature ranging from one hundred and one degrees to one hundred and three degrees Fahrenheit, and pulse about ninety to one hundred, at the morning visit on the 19th. I found in the evening of the same day, temperatures from one hundred and three degrees to one hundred and five degrees Fahrenheit; pulse from one hundred to one hundred and twenty.

The daughters at home ranged in age from fifteen to eight years. The daughter in Sac county is eighteen years old.

All had tenderness over the stomach, but not over the lower abdomen; some nausea; marked headache; stiffness and soreness at the back of the neck; chilly sensations, and markedly red tongue. Two had looseness of the bowels with very foul odor in the discharges. The others afterward developed a fetid diarrhœa.

One grown daughter, and the mother, and a small brother five years old were quite well, and have continued so. Inquiry as to the habits showed nothing unusual eaten or done. But the mother, the daughter and small son were in the habit of drinking tea and coffee — no water. The others all drank water freely. Their well is situated in the lowest point in the hog-yard. Quite a steep and high hill extends from the house to the hog-yard. Last Fall the hogs had cholera — so called. I have seen a good deal of this so-called cholera in that neighborhood. Its symptoms are first, loss of appetite, then constipation, drowsiness, diarrhœa, increasing and fetid, apathy, hemorrhage of bowels, extreme emaciation, death.

This hog cholera is very common in Crawford county, and the wells are often at some low place in the hog-lot. Typhoid fever is quite uncommon, and less so in the country than in the towns. In the last two years there has been a large number of cases, but none at all before within a mile of this farm.

The Woodbridge treatment was used thoroughly with three daughters at home. One of them became permanently free from fever after the fourteenth day She had at first a temperature of one hundred and five degrees Fahrenheit, and pulse one hundred and eight. She had severe diarrhœa. All had free bleeding at the nose, and became quite tympanitic after the first week. Two other girls who took the Woodbridge treatment, became free from fever—one after the twenty-first day, the other after the twenty-fourth day. The father and other daughter at home were much worse than the others, the father being slightly delirious. They began the Woodbridge treatment about the fourteenth day, under which they seemed to improve, the father for three days, the daughter continuously. On the nineteenth day the father had a sudden, severe relapse, and died on the twenty-second day.

The girl who was the sickest developed severely the bronchitis peculiar to typhoid fever. Sibilant rales, and afterward moist rales were quite easily heard all over both lungs. She expectorated freely.

Dr Johnson diagnosed typhoid fever as affecting the daughter in Sac county.

The water in the well above described, when added to sugar, and set in a warm place developed the odor of rancid butter. Ordinarily it smells and tastes like the best water.

Vail, Iowa. W. F. WRIGHT.

SMALL POX

During the biennial period there have been but three outbreaks of small-pox within the State.

July 26, 1895, a case was officially reported from Douglas township, in Clay county. The subject was a male adult who had come from Etnaville, Ohio, arriving July 16th, where he had been exposed to the disease, and was supposed to have been quarantined there. Quarantine was at once established, and the remainder of the family who had been exposed, consisting of one adult male, one adult female, and a babe, were vaccinated. On the 28th of July the male adult developed variola, followed by the female August 8th, and the babe August 24th. All recovered except the babe, who died September 4th, from pneumonia, caused by taking cold. Quarantine was released September 18th. The attending physician states that the disease was greatly modified by the vaccination. The original subject claimed to have been vaccinated thirty years prior.

AT DAVENPORT.

In June, 1895, Dr. Cantwell, health officer for the city of Davenport, reported a suspected case of small-pox, the subject being an adult male person. He was immediately sent to the isolation hospital, and restrictive measures at once applied.

The disease proved to be varioloid in mild form, and passed to rapid recovery. The source of infection could not be determined. There were no other cases.

AT DUBUQUE.

August 29, 1895, Dr. Wieland, health officer of the city of Dubuque, reported the case of a man employed on a river boat, who came ashore sick and was sent to the marine hospital, where varioloid was soon developed. He was removed to an isolated place, and the people on the boat, the family where he had stopped, and those who had been exposed at the hospital, were promptly vaccinated and the necessary measures adopted to prevent further infection, and there were no other cases.

PREVENTION—VACCINATION.

There is no part of this subject that is of so much practical importance to the public as immunization. The Jennerian procedure has become so firmly established that it would be a work of supererogation here to seek to affirm it.

The Report of the British Royal Commission on Vaccination which has recently been made public may be regarded as a complete vindication of the claims of vaccination to be prophylactic against small-pox. This gratifying result has been arrived at after years of patient labor over various lines of research. History, experience and statistics combine in the commissioners' report to make manifest the protective influence of vaccination. It is admitted that in a certain—happily a small—proportion of the cases accidents do occur. Erysipelas and inflammation, leading sometimes to gangrene and death, have supervened among the poorest and worst situated patients. The recommendations of the commissioners are fairly radical, and if adopted by parliament will almost amount to an absolute reversal of the policy hitherto pursued by the local government board in this matter. That policy can be summed up in two articles of faith—first, the use of arm-to-arm vaccination; second, the encouragement of public vaccinators and public vaccination stations. The bitterness which the poorer classes feel against public and compulsory vaccination is intense; so much so that magistrates can rarely be found to inflict any penalties on parents who disbelieve in it. The commissioners recommend, above all, the use of calf lymph; they advise that the doctor should go to the patient instead of the child being brought to the station, and that the State should see to it that a supply of calf lymph is within the reach of every vaccinator.

After reviewing all the evidence the Commission find:

1. That vaccination diminishes the liability to be attacked by the disease.

2. That it modifies the character of the disease, and renders it less fatal and of a milder type.

3. That the protection it affords against attacks of the disease is greatest during the years immediately succeeding the operation of vaccination. It is impossible to fix with precision the length of this period of highest protection. Though not in all cases the same, if a period is to be fixed, it might fairly be said to cover a space of nine or ten years.

4. That after a lapse of the period of highest protective potency, the efficacy of vaccination to protect against attack rapidly diminishes, but that it is still considerable in the next quinquennium, and possibly never altogether ceases.

5. That power to modify the character of the disease is also greatest in the period in which its power to protect is greatest, but that its power thus to modify the disease does not diminish as rapidly as its protective influence against attacks, and its efficacy during the latter periods of life to modify the disease is still considerable.

6. That re-vaccination restores the protection which lapse of time has diminished, but the evidence shows that this protection again diminishes, and that to insure the highest degree of protection which vaccination can give, the operation should be at intervals repeated.

7. That the beneficial effects of vaccination are most experienced by those in whose case it has been thorough. It may be fairly concluded that where the vaccine matter is inserted in three or four places it is more effectual than when in one or two places only, and that if vaccination marks are of an area of half a square inch, they indicate a better state of protection than if their area be all considerably below this.

The Commission believes that there is no evidence to substantiate the statement that vaccination has increased the mortality from tabes mesenterica, scrofula, pyemia, bronchitis, diarrhœa, and skin diseases. The possibility of infection with syphilis and erysipelas is acknowledged, but the sum total of the real dangers of vaccination is insignificant when compared to the enormous good of vaccination.

NOTES FROM THE EPIDEMIC IN CHICAGO.

The following is reproduced from the report of the Health Department of the city of Chicago, in May, 1897:

On the sixth of March Charles Griffin, colored cook on an excursion dining car, arrived in Chicago from the City of Mexico via St. Louis and Toledo. He was not discovered by the department until the night of March 11th, when he was found in an advanced pustular stage of small-pox. He was, therefore, obviously in a contagious condition in Toledo and possibly so while in St. Lôuis. He and his wife—who had nursed him during the preceding five days, living in one room—were at once removed to the Isolation Hospital, where he died four days later, March 15th. He had never been vaccinated, nor had his wife previous to this exposure. She was vaccinated daily until the fifteenth when "it took well," but small-pox developed on the seventeenth—the twelfth day after her infected husband reached home.

On April 5th a third case was discovered, which, although in a locality some five miles distant from the Griffin cases, was traceable to these through a colored washwoman. When discovered this case was also in an advanced pustular stage of confluent small-pox, and, notwithstanding immediate and repeated vaccinations, two other non-previously-vaccinated members of the same family were attacked with the disease on April 16th.

April 21st a tramp moulder, who had recently been in St. Louis, Cincinnati, Cleveland and Toledo, arrived at his brother's house in Chicago and remained until May 5th. Two days later, May 7th, the brother and his wife were taken sick and on the tenth the disease was recognized as small-pox. At the Isolation Hospital the man said he had noticed some "pimples" on his brother's face and forehead. The man, who exhibited two good scars from vaccination in infancy, recovered; the woman, never vaccinated, died of hemorrhagic small-pox May 12th.

Positive proof is lacking that the tramp contracted his disease from the Mexican excursion train, but he had recently been in both Toledo and St. Louis; with the former city the excursion train cook is identified: at the latter city a small-pox outbreak—April 20-28—is traced to the exposure of Mexican goods, souvenirs, etc., brought back by the excursionists from the City of Mexico.

There are two points of especial interest in the foregoing history: First, that, notwithstanding hundreds of persons in this city were exposed to these cases, during the highly contagious stage of small-pox, between March 6th—the date of the arrival of the colored cook, Griffin—and May 7th, the date of the removal to hospital of the last cases, only six of those so exposed contracted the disease. This fact seems to illustrate very strikingly the almost perfect vaccinal protection of the population of Chicago and to demonstrate again the wisdom of the old adage concerning prevention and cure and the vital importance of maintaining the present system of continuous, unremitting vaccination—pushed through all available agencies, public and private. Incidentally, in this connection, should be mentioned the thorough-going work of Chief Medical Inspector Dr. Garrott, and his corps of vaccinators. For a number of blocks or squares surrounding each infected house every person was at once vaccinated or revaccinated; nearly five thousand packing house employés alone were similarly treated, as a result of the third case, which occurred in the packing house district; and a wholesale vaccination of railway employés, especially of the crews of trains running south into Texas and the Gulf states, was secured.

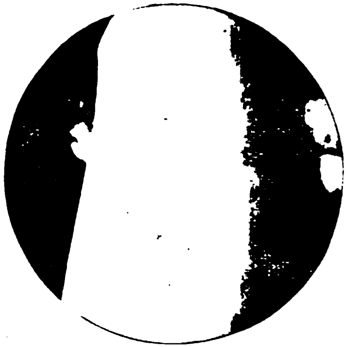
The second point of interest is the result of the use of the glycerinated vaccine lymph — not alone for prophylactic purposes, but as a curative, or at least modifying, agency in the disease itself. All of those exposed were immediately vaccinated without regard to period of exposure or evidence of previous vaccination. With the exception of the woman who died of hemorrhagic small-pox May 12th — first seen May 10th, after twenty days' exposure — the vaccinations proved effective and, in the experienced judgment of Dr. Garrott, materially modified the character of the graver disease. Even in cases not vaccinated until after seven days' close contact with the infecting patient each vaccination for three successive days "took" typically, and the disease was practically aborted — only a few papules and still fewer vesicles appearing, these rapidly drying up and the patient convalescing within an average of seven days. The result has led Dr. Garrott to adopt the practice of daily repeated vaccinations — instead of every second or third day — until "it takes," and to expect modifying effects, even after seven days' exposure — instead of, as formerly, regarding attempts at vaccination as useless after the third day of exposure.

This lymph, adopted by the department in August, 1895, after a systematic bacteriologic and clinic examination of samples of all forms of vaccine then in use, is an emulsion of vaccine lymph in glycerin, stored in sealed glass tubes, each tube containing material for one vaccination. Dr. Gehrmann's experiments show that the period of the contact of the pus bacteria with glycerin necessary to destroy their vitality is from fifty to sixty days. Dr. Garrott's experiments show that the period of efficiency for glycerinated vaccine that can be uniformly depended upon, as determined by primary vaccinations, is from one hundred and twenty to one hundred and fifty days. It is now, therefore, a definite provision that the vaccine delivered to the department for use shall be a sixty-day emulsion in glycerin, supplied in such quantity as that the entire installment can be completely used within thirty or forty days after its receipt.

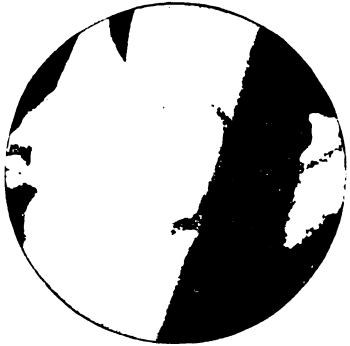
After nearly two years' personal use, and supervision of the use of upwards of two hundred thousand tubes of glycerinated lymph, Dr. Garrott says: "I have never found any vaccine that was so promptly and uniformly successful in producing typical results. I have noted in using this fluid vaccine a diminution of the usual inflammatory areola surrounding the vaccine vesicles, less constitutional disturbance, freedom from suppurating sores, inflamed glands and lymph vessels, and it produces a more active and typical vesicle than occurs with virus dried upon an ivory or quill point, resulting in regular, uniform, typical cicatrices."

The subjoined illustrations from photographs of vaccinal cicatrices, taken by Dr. C. St. C. Drake during October, 1895, show the difference in the cicatrices resulting from vaccine points and from liquid vaccine:

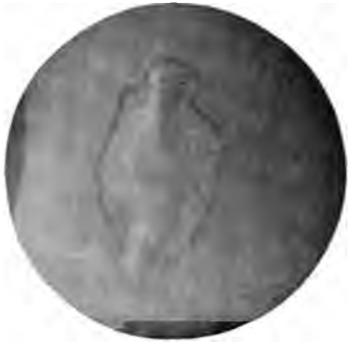
FROM VACCINE POINTS.



Ida P.—*æt.* 12. Vaccinated in 1890.
Scar 1⅛x2⅛ inches.

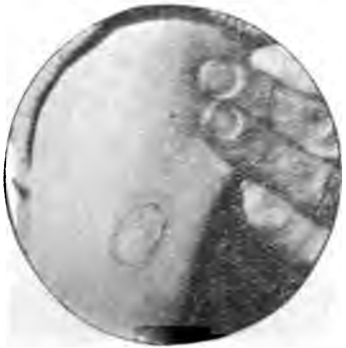


Minnie O.—*æt.* 12 Vaccinated in 1890.
Scar 2¼x4 inches.

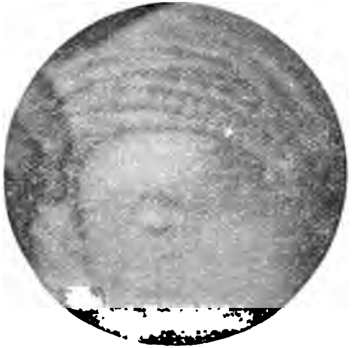


Fritz H.—*æt.* 11. Vaccinated in 1893.
Scar 2⅛x4¾ inches.

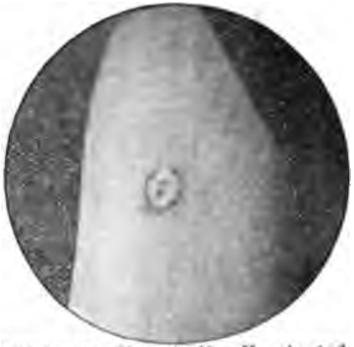
FROM LIQUID VACCINE.



Carrie A.—*æt.* 9 Vaccinated September 6, 1895.



Alice A.—*æt.* 6. Vaccinated September 13, 1895.



Wilhelmina V.—*æt.* 10. Vaccinated September 19, 1895.

THE PROPAGATION, PRESERVATION, AND USE OF VACCINE VIRUS.*

Mr. President, Ladies and Gentlemen:

During the twenty-five years that have elapsed since the introduction of true animal vaccination in this country in 1870, the many mooted points regarding it have been thoroughly disposed of by careful observation and experience, so that to-day we can fairly say that we have quite as exact a science in this as we can ever hope for in any branch of medicine. Many observations have been confirmed, many theories have been exploded, but the grand result that has been obtained is this—that all earnest students of the subject now agree that pure animal vaccine virus, transmitted uninterruptedly from one young bovine animal to another, is far superior to all other forms of vaccine. This is true both of the results in individual cases and of the protection afforded to large communities on the advent of an epidemic of small-pox. The large proportion of active practitioners to-day have had but little experience with any form of vaccine other than that taken directly from the animal, or perhaps a few removes from this through human subjects.

To understand clearly the present status of vaccine production, however, I hope that some of you to whom it may be an old story will pardon me if I glance briefly at the various sorts of vaccine that have been employed during the century whose completion we celebrate to-day.

First of all, we have the Jennerian vaccine, viz., the virus taken by Jenner and his contemporaries directly from animals in whom the disease occurred spontaneously, inserted into the arms of human subjects, and carried from arm to arm through a succession of infants down to the present time. This virus is still used in England to some extent, although in recent years, since the establishment of a government institution for propagating calf lymph and of a number of private establishments for the same purpose, it is rapidly going out. In America, this was the vaccine in general use prior to 1870, and when the infants vaccinated were carefully selected and healthy, it was superior to any other sort of virus employed before the systematic production of pure animal vaccine.

Secondly, in several countries there have been cases of cow-pox discovered at different dates during the last sixty years, from which virus was taken and propagated thereafter from arm to arm. This gave a vaccine nearer to the animal than the Jennerian lymph, but in a few years it became indistinguishable from the latter in the vesicles produced and other symptoms.

The great objection to these "stocks" of vaccine has always been that in the course of years their vigor has steadily deteriorated, producing less and less constitutional effect and more and more short-lived vesicles. To counteract this in the case of the Jennerian lymph, more insertions were made in the arms of the patient, often as many as nine in each arm. Even now, from three to six insertions are customary with many European physicians. This is entirely unnecessary with animal virus. My custom is to make two scarifications on the left arm or leg, but one typical vesicle is quite sufficient.

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*An address delivered before the General Session of the American Medical Association, at the Jenner Centennial Celebration, Atlanta, Ga., May 7, 1896, by Francis C. Martin, M. D., Boston, Mass.

I will not weary you with a long dissertation on the dangers of a third form of vaccine, obtained from the variolation of kine, or the serious defects of retro-vaccination—that is, the vaccination of animals with humanized virus. These different forms of virus will always have great scientific interest to experimenters, but we have happily arrived at a stage of vaccine production where we can ignore them as having any important bearing on the practical part of the subject.

Not one of all these varied forms of virus can compare in practical value to-day with true animal vaccine. Perhaps this statement seems rather *ex cathedra*, but I have ample reason, begotten by many years of experience, for affirming its truth. Unfortunately, however, there is no time to enter upon a statement of it here.

True animal vaccination, as we now understand it, originated in this way: On March 28, 1866, a case of spontaneous cow-pox was discovered in a heifer thirty months old, at Beaugency, Department of Loire, France. From virus derived from inoculation from this animal, Professor Depaul, de la vaccine, continued the propagation of pure animal vaccine by inoculation of one young heifer directly from another, at Paris, under the auspices of the Academy of Medicine. Various other cases of spontaneous cow-pox have been discovered from time to time, and with virus from such animals vaccination is now carried on in almost every county in Europe.

The Beaugency stock of virus produced by Professor Depaul was the one introduced into this country by my father, Dr. Henry A. Martin, in 1870. He wrote most indefatigably and used all his efforts unsparingly to secure the adoption of this new method of vaccination; but the results exceeded his most sanguine hopes Within two years the profession had adopted the method enthusiastically and almost universally.

Since that time results have only strengthened the favorable reception accorded to true animal vaccination, and to-day physicians who use humanized virus, even of a few removes, are so rare as to be remarkable. I acknowledge, as regards these gentlemen, that animal vaccine, carried through one remove, viz., through a perfectly healthy child, is an excellent virus. But with every further remove comes greater and greater risk of some imperfection in the child, and so danger to the character of the virus. This danger is by no means so great as is popularly supposed, but it is real and demands consideration.

With ample opportunity to-day of securing pure animal vaccine, I can see no excuse for the use of long-continued humanized lymph. Any serious complaints against animal vaccination can be traced to improper methods of producing or keeping the virus, but can never be fairly made against pure virus, produced honestly and scientifically, and in the best manner.

True animal vaccination is the inoculation of a young selected animal of the bovine species from an original spontaneous case of cow-pox, from this others, and so on, in continuous and endless series, as the source, and the only source, of virus for the protection of the human race against variolous disease. This is the definition given by Dr. Henry A. Martin in his report to this association in 1877, and I cannot improve upon it. It is in accordance with this definition that the Beaugency stock, brought here in 1870, has been continued constantly up to the present time. I am sure of one point, however, that was still in doubt during my father's life. There is no fetich or charm in any particular "stock" of virus, provided the original case of cow-pox is unquestionable, and provided, too, that the virus is propagated properly and on animals of the right age, continuously from the start. This last matter is of essential importance.

The propagation of animal vaccine, as at present carried on, may be broadly divided into two varieties, viz., the European method, which now obtains very generally throughout Europe, and the American method, or that introduced here by my father and still practiced with some modification by myself.

Various so-called "improvements" of the latter method have been devised by persons of more ingenuity than ingeniousness, which are doubtless "labor saving" and pecuniarily profitable, and which I must presently refer to, but only to warn you against them.

First, then, let us consider the European method. A young bovine animal, from six weeks to six months old, according to the ideas of the different institutions, is strapped upon its back with its legs distended, on a specially adapted table. The entire abdomen is then shaved and washed, and the operator takes a rather heavy instrument, shaped like a bleeding-lancet at the point and flattened at the sides, with which he makes a series of rows of line cuts, about one inch long and one and a half inches apart, through the cuticle, merely deep enough to draw a slight tinge of bloody serum. On the flat surface of the instrument are the crushed particles of the crust of a matured vesicle from another animal lying on an adjacent table. As the operator cuts with the point of the instrument, he turns the flat side to the cut, and quickly rubs in the bits of vesicle. This is done very rapidly, so that the entire abdomen is inoculated in a very short time. The calf is then released and returned to the stable. On the maturity of the vesicles, which is about the fifth day afterward, the animal is replaced on the table, when we see, instead of the rounding vesicles to which we are accustomed here, a series of very narrow lines of inflammation, with vesicular edges. The belly is carefully washed, and the operator seizes enough of the loose abdominal skin with a special sort of curved lock forceps, to completely include the whole of the vesicular line. The entire vesicle is then scraped off with the edge and carefully preserved on the flat side of the vaccinating instrument. This crushed vesicle is immediately inserted into other animals and into the arms of patients. To preserve the virus for future use, and to send out to physicians at a distance, a number of the vesicles scraped off as I have described are put in one mass in a sterilized agate mortar, and immediately mixed with absolutely pure glycerin and filled into tubular glass bottles. These are carefully corked, dipped into paraffin. and put away in a cool, dark place. They are kept thus for several weeks, and it is claimed that by this process all the extraneous micro-organisms present in the lymph are destroyed, while the activity of the virus is in no way deteriorated for a long time. After this period of purification the contents of the bottles are thoroughly triturated with a little sterilized distilled water. This is done by means of a special triturating machine, of elaborate construction, which reduces the mass to a fine homogeneous emulsion. This is filtered and then put up in capillary tubes, "lymph squares," and vials. These are merely different forms of putting up the lymph, but the substance is the same in all of them. The use of ivory points in Europe has been almost entirely superseded by these tubes and "squares."

I will reserve any criticism of this process, gentlemen, until I have described to you the American method, which is as follows:

I take a young bovine animal, about eight or ten months old, selecting perfectly healthy, clear-skinned animals that are thoroughly weaned and can live entirely on hay and meal. The younger the calf the better, so long as it answers these requirements I place the animal on its side on a special table, and have portions of the escutcheon and belly shaved and carefully washed. I then vaccinate in precisely the same way as in the human subject, by transverse scarifications, drawing a little blood-tinged serum, but making a scarified surface about two-thirds as large as the thumbnail and nearly circular. I use a square portion of the abdomen, anterior to the teats, and place the scarifications in rows of four or five, about two inches apart. My object is to produce a vesicle as nearly as possible to resemble the natural eruption of the disease. I vaccinate directly from another animal.

Up to this point, you observe the differences of procedure from those in Europe are rather of detail than of important essentials. But here comes in the radical difference of the two methods, which lies in the collection and preservation of the lymph. Having scarified the fresh animal, I turn to one on which the vesicles have matured, and selecting a typical vesicle. I carefully remove the crust *in toto* and throw it away Lying under the crust is a thin layer of cheesy pus, perfectly innocuous perhaps, but still pus. This is carefully washed away, leaving a bare, raw surface. Thorough cleanliness is used in all these steps, but no antiseptics are employed, as they would simply destroy the virus. As a rule, I apply no pressure to the denuded surface but leave it severely alone, and at the end of several minutes small drops of a sticky, amber-colored fluid are seen oozing out all over the vesicle. These coalesce and constitute the fluid vaccine lymph, which I use to rub into my scarifications on the fresh animal. To secure lymph for future use and to send away, I have the ivory points dipped carefully by hand, one by one, in this same lymph, dried in rows upon shelves, and then immediately packed in small bundles covered with cotton and silk paper, and hermetically sealed up in gutta-percha tissue. These packages are shut up in air-tight glass jars, away from the light and packed in ice, and always sent out with a caution to keep the vaccine cold, dry, and dark. The best practice is to keep them in a corked vial in a dark refrigerator.

This, gentlemen, in brief, is my method of producing animal vaccine. and an experience of over twenty-five years with it has convinced a large portion of the profession of the country, as well as myself, that it is by far the best, most scientific, and most reliable method. Certainly it is the one best adapted for the climatic conditions of America. The essentials of dryness, darkness, and cold, which are requisite to keep the virus properly, are easily obtained here, where our climate is, in general, dry; and where the use of ice and refrigerators is so universal. In many parts of Europe, the damp climate and the extreme rarity of ice, makes a strong argument in favor of the tubes, which are not so easily affected by climatic conditions.

Vaccine virus produced in the manner employed by myself secures typical vaccine vesicles, without any undue severity of symptoms, and affords perfect protection against variola. It is very important to bear in mind the fact that a very sore arm is no proof of proper vaccinal effect.

But it must be remembered that a very large percentage of the vaccine in America is produced by men who, under the guise of some "vaccine company" or "vaccine farm," look entirely to the commercial side of the matter, and, although utterly unheard of in the scientific world, are keenly alive to any method of making more money.

To these persons my method has these very serious objections, viz.: that it takes constant care and skill, that it is expensive, and that the supply of virus from one animal is so limited. In other words, to supply a large number of vaccine points, a large number of calves must be employed.

Now, it has long been known that the greater the age of the animals vaccinated, the more marked and severe are the symptoms produced; and, further, it was found that by increasing the size of the vesicles a very much larger quantity of serum, "virus" by courtesy, could be obtained, although much thinner and more dilute.

From these facts the brilliant theory was evolved that an ideal virus could be obtained by using full grown cattle, three or four years old, and making deep scarifications two inches square or larger. These scarifications in no wise resemble a vesicle, but make a large angry sore, and when ruptured an enormous quantity of thin serum is poured out.

But, argued these *savants*, by this means we can get a large amount of virus from one cow and the dilution of the lymph will be counteracted by the greater vigor obtained from the full grown animals. This idea appealed with great force to the commercial mind, and in accordance with it millions of vaccine points have been produced. The method is labor-saving and cheap, but the theory is utterly wrong, the fact being, it is true, that the larger the animal used the more vigorous the vaccine germ and the more violent the effects on the human subject, but the change from a small vesicle to a large angry sore only increases the flow of inflammatory serum, tending in no way to lessen the vigor of the vaccine germ, but very much diluting the amount of these germs in the so-called virus. In other words, the amount of true virus is not increased, but it is obtained adulterated with a large amount of serum. The practical results frequently obtained from such virus are either very sore and troublesome arms or no vaccinal effect whatever.

Another labor-saving improvement which I must warn you against is the method of fixing the ivory points between two strips of rubber-covered wood, in rows of fifty to one hundred, so that they resemble a picket fence. The operator then ruptures the vesicle, dips a camel's hair brush in it, and paints the pointed ends of the points over rapidly with the brush, leaving an almost invisible coating of vaccine on them. This can be done so rapidly that an ordinary day's work by the proper method is nominally accomplished in fifteen or twenty minutes. Some of the points prepared in this way will take. A great many will fail. There is no possible excuse for this method of charging the points, nor for the method of large scarifications on full-grown animals, except that they are "labor-saving" and "money-making." On all scientific grounds they are unqualifiedly bad and objectionable.

During the past year I have investigated the reasons for the preference in Europe for tubes rather than for points. From conversations with the authorities there and a careful observation of their methods, I am convinced that the modern tube, prepared as I have described above, is much more reliable than the old-fashioned tube of clear virus taken directly from the vesicle.

Our method, however, of charging the ivory points is much more simple, economical and reliable, and we certainly obtain a far purer virus at the start. The vesicle which they grind up and use is not the old-fashioned vaccine crust, with which many of you are familiar. That was the dried covering of the vesicle, which was allowed to remain undisturbed until it dropped off naturally at about the twentieth day. It was then cleaned thoroughly and scraped, and was perfectly dry and almost odorless. The European crust is taken at the height of the disease, when its reticulations and under surface abound with pus cells, and these are all included in the mass that is combined with the glycerin. I am not prepared to deny that this combination renders all the germs present, except the vaccine germ, inert and innocuous. I only say that, if true, it is an extraordinary fact, and that certainly the pure, clear virus that is collected on the points, after all the pus is removed, is a very much purer lymph, as it is taken from the animal.

The real reason, as it seems to me, for the adoption of these tubes in Europe lies in the difficulty of preserving the points in a moist climate and of obtaining ice with which to keep them. We have no such difficulties here, and with us the ivory point will long keep its supremacy as the best form of preserving and using vaccine.

Every one of you has his favorite way of vaccinating. My way is to make two sets of scarificatious about two inches apart. I cut with a dull bleeding-lancet about half a dozen short lines close together, just deeply enough through the skin to draw a tinge of serum and blood. These I cross with a similar set of cuts at right angles. I thoroughly dissolve the virus on the point with a little water, then wipe the cuts thoroughly, and immediately rub the virus into the cuts for about ten seconds with the flat side of the point. Then I expose the arm for one minute to the air. No plaster or subsequent dressing is necessary. The arm should be washed at bedtime. In three or four days the vesicle will begin to appear and will be at its height in about eight or nine days, after which it will decline. Unless the crust is broken there will be no severe symptoms with good virus, and indeed there should never be bad and sloughing arms if the patient is in any reasonably healthy condition at the time.

DIPHTHERIA.

It is pleasing to announce that the presence of diphtheria during the biennial period was less frequent than during the preceding period, demonstrating very conclusively that local boards were more faithful in their duties; for, being a preventable disease, it cannot prevail to any extent, or become epidemic in any community, except by assent of local boards. And herein lies a responsibility which local boards very generally fail to recognize. The record of diphtheria in any community is the record of official faithfulness or unfaithfulness; and every spreading of the disease beyond the original source, and every death therefrom, is a charge, socially and legally, against them. Having the authority and means to prevent it, they are both civilly and criminally liable for their negligence.

The imperfect, unreliable, and unsatisfactory returns made of vital statistics render it impossible to give any comparative mortuary report worthy of credence.

During the period there has been very general complaint against the arbitrariness of the rule respecting heads of families placed under quarantine. As complete isolation of the sick from the well is the essence of quarantine, the Board has modified the rule relating to diphtheria and measles as follows:

> When a family is quarantined for diphtheria or measles, the head of the family, or bread-winner, shall have the privilege of attending to his regular business, and of going to and from his house only when complying with the following conditions:
>
> *First.*—He shall change his clothing before going to and leaving his home to go to his place of business.
>
> *Second.*—He shall wash his hands, face, head and beard with a 2¼ per cent solution of carbolic acid, each time after leaving his home to go to his place of business.
>
> *Third.*—While in the house he shall not act as nurse or live in the same room with the sick person.
>
> *Fourth.*—He shall not attend any public meeting, or attend any place where persons are congregated
>
> *Fifth* —This privilege shall not be granted to school teachers, or to any person whose business brings him in intimate contact with children.

There is prevalent throughout the State a feeling of hostility to quarantine, engendered largely by injudicious action of local boards. It is regarded as an arbitrary intervention of human rights, whereas it is simply a misfortune liable to fall upon a family any moment. This antagonism seeks the release of quarantine in the shortest time possible, if indeed it does not evade it altogether.

The State Board has very wisely provided that quarantine shall be maintained not less than seventeen days after the recovery of the last case in a family, and after there has been proper disinfection of the premises and person. The purpose of this is to cover the incubation period, in case there has been unknown exposure of other persons. It is a provision for safety. And even this is not sufficient. Experience and observation have demonstrated that after the membrane has disappeared the germs persist for many days—even months—and the patient, though to all outward appearance has recovered, can transmit diphtheria to others. An instance in point occurred recently in one of the southern counties of the State, where several members of a family had diphtheria. There were two deaths. On the eighteenth day after the convalescence of the last case, the premises having been previously disinfected, the quarantine was released. The next day a boy of the family was attacked by the disease, followed by the hired girl a week after, and from these two several other persons became infected.

Whether or not the germ of diphtheria has entirely disappeared from the throat of a patient can only be determined to a certainty by bacteriological examination. The safety of the public therefore would be best secured if local boards, especially in cities and towns, and massed communities, would establish a rule that quarantine in cases of diphtheria shall not be released until a bacteriological examination has demonstrated the absence of the infecting germs from the throat of convalescent patients. In many large cities this precaution is now taken with highly beneficial results. The same method may be used in a suspected case of the disease, and the result obtained within twenty-four hours, thus quickly settling a vexing question of diagnosis.

DIPHTHERIA ANTI-TOXIN.

Ever since anti-toxin was announced as a curative agent in diphtheria, there has been increasing interest to know what the outcome would be — not so much from a therapeutic as a sanitary standpoint — or more strictly stated from a restrictive standpoint. If it possesses the curative value claimed — destroying the toxic, and therefore the infectious character of the disease, in two or three days — it is valuable, not for the number of lives saved; but by shortening the duration of the disease the period of communicability from exposure would be correspondingly shortened. It would be interesting to present the results of extended and painstaking experiments and observations as to the reliability and great value of anti-toxin as a curative agent in the treatment of this dreaded disease.

While a great deal has been written against its use it must be conceded that the consensus of opinion, even after eliminating much that smacks of too hasty and superficial experimentation, is that the death-ratio has been lowered by its use and that the duration of the disease has been greatly shortened.

Perhaps the most valuable testimony in favor of its use comes from the celebrated pathologist Virchow who as is well known has been hostile to the germ theory of disease.

At a meeting of the Berlin Medical Society, in December, 1894, Virchow stated that during the months of June and July at the Kaiser and Kaiserin Frederick Hospital five hundred and thirty-three cases were treated — three hundred and three with serum (anti-toxin) and two hundred and thirty without. The former had $13\frac{2}{10}$ deaths and the latter $47\frac{8}{10}$ deaths!

The Iowa State Board of Health has given no official expression as to the value of this agent, either as a curative or preventive agent.

DIPHTHERIA — QUESTIONS ANSWERED.

During the month of June, 1895, diphtheria, mild in type, and with no fatalities, was prevalent in a town in one of the eastern counties of the State. Some of the physicians regarded it as diphtheria, and others as follicular tonsilitis. Some sputum or portion of membrane was sent to the bacteriologist of the State Board for examination. He reported "true diphtheria" based upon the presence of the Loeffler bacillus, whereupon the child was promptly quarantined, though it was alleged the child had been entirely well for four days prior to the establishment of the quarantine. The establishment of the quarantine, under the circumstances, led to an animated telegraphic and postal correspondence between the Secretary of the State Board and the residents of the town.

Dr.——— declared he was skeptical in regard to the germ theory of disease, and submitted the following interrogatories:

(1) "Does the State Board accept the theory that the presence of the Klebs-Loeffler bacillus necessarily proves that this bacillus is the cause of genuine diphtheria in man?"

(2) "Does the State Board accept the theory that there are two varieties of the diphtheria bacillus—one pathogenic, the other non-pathogenic; the first found in genuine diphtheria, the latter in various benign throat affections, and in the throats of healthy individuals? Or

(3) "Does the State Board accept the fact of true scientific pathology, which is applicable in actual practice and has stood the test of years, and has been sustained by such authorities as Professor Virchow, Lawson Tait, Professor Park, of New York, Professor Chappel, and Professor Houseman?"

The Secretary has no authority, nor is he disposed, to express the individual opinion of members of the State Board. The following, therefore reflects his own views, which in a measure are in accord with the practical belief of the Board, as expressed in its rules and regulations for the prevention and restriction of diphtheria:

(1) He believes that the presence of the Klebs-Loeffler bacillus necessarily proves that this bacillus is the cause of genuine diphtheria in man. He recognizes the fact that this bacillus has been and may be found in the mouth of healthy persons—persons who fortunately have vigor of constitution and general health sufficient to prevent toxic conditions. He believes that no case of genuine diphtheria can be found in which this bacillus is not present, although it may not be found in all cases.

(2) Yes.

(3) He "accepts the facts of true scientific pathology" so far as they are demonstrated to be *facts*. He believes they are facts "applicable in actual practice." As to their having "stood the test for years," he admits that most of the demonstrated facts of pathology as recognized to-day are modern and that the laboratory is playing havoc with many of the cherished theories of yesterday. As to the names paraded by Dr. —— and their theories, the parties are human and their theories are not Gibraltars. There are others equally eminent and vastly superior in numbers, whose opinions based upon careful observation and impartial investigation, are widely at variance with the views expressed by the parties quoted by Dr. ——. The State Board of Health is laboring for the protection of the public against communicable diseases, and they cannot afford to wait until all these questions are incontestably settled.

The Board has taken the only sensible position it can, and that is to formulate and promulgate rules and regulations respecting small-pox, diphtheria, etc., that express the consensus of opinion of nearly all eminent pathologists and bacteriologists of the world as to the cause, prevention and restriction of the spread of these diseases. Those who are interested in the details of the discussions relative to the germ theory of disease are respectfully referred to the medical press of the country and to standard works upon bacteriology and upon the causes of infectious diseases.

It is not wise for local boards of health to stand around with their hands in their pockets waiting for physicans with rival pet theories to determine the preponderance of evidence as to whether a sore throat is produced by a Loeffler bacillus or by some other bacillus, or by a coccus. If the attending physician pronounces it diphtheria, or any quarantinable infectious disease, quarantine and isolation must be at once established, and such measures used as will best protect the public. If later it shall be found the disease is not infectious, the quarantine can be released, and no person will be injured thereby.

MEASLES.

There are two very erroneous and harmful opinions prevalent among parents, and also entertained to some extent by local boards of health, that measles are inevitable, and that the best time to have the disease is in childhood. It is a dangerous folly to so hold or teach. There is no necessity for any child to have measles, whooping cough or scarlet fever, and every case of them is evidence of negligence. They are preventable diseases, and the wanton exposure of children to them on the plea that they are children's diseases and they will have them some time is not only dangerous folly but it is criminal folly, as many have learned to their great regret.

It is probably true that over two hundred children die in Iowa annually from measles. Beside those who die many hundreds are physically disabled by having fastened on them diseases of the lungs and air passages and of the eyes and ears.

No good reason can be given for desiring a child to be sick with any disease, and what may be deemed right and safe in one case may be wrong and fatal in another. Because one child is rugged enough to throw off the disease easily is no reason why he should be turned loose and attend school or mingle with other children and be the means of communicating the disease to those less vigorous, and thus inflict pain, expense and possible death. An ounce of prevention is worth a pound of cure. It is a preventable disease. Statistics show a large percentage of deaths from it, and this is abundant reason for the efforts being made to prevent its spread and exterminate it wherever it makes its appearance.

The report of vital statistics of Michigan for the year 1894 shows that from 1890 to 1894 there were twenty-two thousand and four cases of measles reported. There were two hundred and fifty-eight deaths. There was no quarantine nor isolation. There were also one hundred and ten cases in which quarantine and isolation were maintained, and there were no deaths. For the year 1894 forty-five per cent of deaths from measles were of children under six years old; sixty-five per cent under eleven; thirty per cent, ten to thirty, and over thirty, none. Of the cases reported over seventy-five per cent were of children under the age of eleven.

Early in the history of the State Board of Health measles was put in the list of quarantinable diseases, subject to all regulations applicable to other infectious and contagious diseases.

Scarlet fever is also one of the dreaded diseases of childhood, and a few years ago prevailed extensively over the State, because of the opposition to quarantine measures. By a sensible dread of that disease and a moderate compliance with quarantine regulations, it is rapidly disappearing. There is good reason to affirm that if quarantine and disinfection were promptly and faithfully observed, both scarlet fever and measles would be as rare as small-pox.

In England it is exceedingly rare to see or hear of a case of scarlet fever. The same method applied vigorously in cases of diphtheria, measles, whooping cough and mumps, would in time stamp out the diseases entirely.

Would not such a course be infinitely preferable to the policy of inviting these diseases and encouraging and assisting them in their demands for fresh subjects by sacrificing our beloved children to their seductive and fatal greed?

Pertinent to this article, and instructive also, is the report of Dr. R. Thorne Thorne to the Secretary of the Local Government Board of London for the year 1895. He says:

> The question of measles as a cause of death in this country has engaged the attention of the medical department for several years. The death rates from most of the diseases of the zymotic class have continually decreased decade by decade, whereas measles has increased, and during the quinquennium, 1890-'94, the deaths from this disease now stand a figure higher than that for any other disease of the zymotic class except whooping cough and diarrhœa. The sum total of the deaths registered as due to measles in England and Wales during the ten years, 1885-'94, reached no less than one hundred and twenty-nine thousand four hundred and twenty-six, or a yearly mean of twelve thousand nine hundred and fifty. Now, measles is a disease the mortality from which falls almost exclusively on children; especially

is it fatal to infants in the second year of life. This is more noteworthy since, relatively to their number, children aged two to five years would appear much more prone to measles' attack than other persons, or than infants under two years. The mortality from measles is much greater in towns than in country places, where opportunities for intercommunication between the healthy and the sick are more abundant than in rural areas.

In view of these and other considerations it appeared desirable to take account of those measures that are likely to avail urban or rural authorities in the prevention of measles, measures designed to meet epidemic prevalence of the disease, or directed toward such control over it on its appearance as to arrest or delay a threatened epidemic. The importance of control of the latter sort is apparent on consideration of the age at which measles is most fatal. If in any district, measles, which formerly was epidemic every other year, be so far discouraged by preventive measures as to acquire epidemicity only every fourth year, it is clear that a large number of susceptible children will, when the epidemic arrives, have reached ages at which the disease is little fatal, and in this way many lives will be saved which were formerly sacrificed to this disease.

Prominent among the difficulties in the way of preventive measures are, on the one hand, the extremely infective character of measles—especially in the early stages, before the nature of the disease is declared—and on the other, the slight estimation in which measles is held by the general public. The first step must be to obtain accurate knowledge of the persons attacked, many of whom never come under medical treatment. Every case reported or heard of must be made the subject of a personal visit. Repeated and detailed inquiries should be made by the sanitary officers in invaded households, if the spread of the disease from such houses is to be adequately controlled.

So, too, regarding schools. If preventive measures are to be of avail, they must be contrived to secure the exclusion from school of all children from any house which is invaded by measles, and if necessary of children living in the neighborhood of invaded houses, and even to all schools, Sunday and private, in the invaded neighborhood, and to other gatherings of children, before real advantage can be expected from the proceeding.

WHOOPING COUGH.

It is evident that very few people have any just conception of the magnitude of the fatality from whooping cough. To those who study vital statistics it is a disease demanding earnest consideration. By the masses it is considered a disease incident to children, of little importance, and not subject to sanitary regulation. Every mother becomes terrorized upon the appearance of scarlet fever in the vicinity of her home. Yet it is a fact that more children die from whooping cough than scarlet fever, and nearly all the deaths are of those under five years, the majority being under one year. The census report states that for the year ending May 31, 1890, eight thousand and thirty-two children died in the United States from whooping cough; while there were only five thousand nine hundred and sixty-nine from scarlet fever.

The following statement is made from the official report of the States, for the years named:

	WHOOPING COUGH	SCARLET FEVER.
Rhode Island, 1895	129	123
Massachusetts, 1895	435	312
Michigan, 1895	140	116
New Jersey, 1896	275	183
Connecticut, 1896	127	65
District of Columbia, 1896	22	7
	1,128	806

The following table shows the deaths for the year 1895, in the cities named:

	WHOOPING COUGH	SCARLET FEVER.
Baltimore	68	59
Brooklyn	263	124
Chicago	122	77
Cincinnati	38	6
New Orleans	22	5
New York	496	468
Philadelphia	251	79
St. Louis	23	20
Des Moines	5	2
	1,288	860

These figures probably do not show more than two-thirds the actual number of deaths, but they are sufficient to indicate not only the wisdom, but the necessity for the intervention of sanitary measures to prevent the spread of whooping cough. Its ravages are greatest among the babies. It is an infectious disease, and is communicated by contact with an infected person or something which has been about an infected person. Isolation of the sick, is the only means of preventing its spread, and this often comes too late, as it is communicable before the "whoop" appears. There is a very general indifference among parents respecting this disease, as has been stated, hence, it is difficult to secure the proper and necessary isolation, during the protracted period through which it runs. Parents exercise little or no caution to prevent exposure. It is not uncommon to hear the familiar "whoop" on the street, in railway cars, and public places.

Mothers should be especially vigilant to guard their nursing babes from exposure, for it is upon those under one year of age the fatality falls most severely. Should the disease appear in a family of children, in which there is a babe, the babe should be removed from the home—at least it should be kept entirely free from all possible contact with the sick.

On the appearance of the disease in a community it is the duty of the mayor of a city or township clerk to take cognizance of it and see that measures are provided to prevent its spread. There is no necessity of shutting up adult members of the family. Children of the family should be excluded from the schools and public gatherings, and all children should be rigidly prohibited from entering the premises, which should be placarded with the danger card. Although the State Board of Health has made no official order for placarding whooping cough yet local boards should see that it is done.

HOW DISEASES ARE SPREAD.

November 30, 1895, the recorder of Rock Rapids, reporting a case of scarlet fever, said the source of contagion was supposed to be a letter received from friends in Illinois whose children at the time the letter was written were sick with scarlet fever.

Having often heard and read of contagious diseases being communicated by letter and by articles of wearing apparel, request was made for further investigation, and the following reply was received:

> Pursuant to request I have investigated the matter and find this letter was received last December (1894), and after being read was laid away. Three days before the child was taken sick the mother was looking over some old letters and the children were around her. When this letter was reached the little girl exclaimed, "There is auntie's letter," and proceeded to open it out and held it some little time. The letter was written by the mother's sister, whom she intended to visit during the holidays, and told them not to come as their children were then all sick with scarlet fever.
>
> There had been no previous cases of scarlet fever in Rock Rapids, and this child had, so far as known, had no other possible opportunity to be exposed.

We think the fact reasonably well established that this child contracted the disease from the letter in question—especially when considered in connection with so many similar cases.

The Medical Inspector for Somerset county, Pa., reported to the State Board of Health as follows:

Two years ago a child died from scarlet fever near Downey. The cradle in which the child died was afterward sold at auction, the purchaser having full knowledge of the death of the child. They washed the cradle thoroughly six times with boiling water, and did not believe that with such cleansing and the lapse of two years there was any danger. A babe eight months old was placed in the cradle to sleep. In ten days after scarlet fever appeared in mild form, which passed to recovery, but was followed by that of a boy two years old, then the mother, next an aunt who had assisted in nursing the children; then the grandmother, sixty years old; and last the father, with all of whom the form was very severe. There were no other cases in the neighborhood.

The Health Officer of Osage, Dr. J. H. Hoffman, writes:

"I was called a short time ago to a family of seven children, all sick with malignant scarlet fever, none of whom had been exposed to the disease, so far as could be ascertained. A short time prior, the family had purchased a dog of a family some distance away, and in that family there had been several cases of scarlet fever. I have no doubt the disease was brought from that family by the dog.

In another locality I was called to a family in which a boy had died, and four other children were sick with malignant diphtheria. The disease was not in the vicinity, and there had been no exposure in the ordinary way. The house and surroundings were in good sanitary condition. Investigation disclosed the fact that a week prior five cats died on the premises with all the symptoms of diphtheria. We usually call such outbreaks "sporaidic," but I have no doubt the disease germs are brought by animals.

For several years diphtheria periodically appeared in a certain locality in Hamilton county. Its nidus seemed to be near an old church building which was also used for school purposes. From this point the disease spread throughout the surrounding country. It was found that a large number of rabbits had been for five years hibernating under the church, and the resident physicians became convinced that the rabbits had planted the germs of the disease.

Dr. Charles E. Young, of White Plains, N. Y., writes that he was called to see a well-developed case of diphtheria, the patient being a woman twenty-four years old. Upon investigation she could recall no exposure to the disease, unless it came from a lock of hair. She then related how a child had died a year prior, from diphtheria. A lock of hair was clipped from its head, wrapped in paper and placed in a box. In rearranging the drawer she found the box, took out the lock of hair, contemplated it for some time, and then replaced it. The next day the first symptoms of the disease appeared. The lock of hair was consigned to the fire.

A physician in a country village was called to a child sick with scarlet fever, which resulted fatally. The source of infection was traced satisfactorily to a letter written by a mother one hundred miles distant, in whose family several were sick with the disease. On receipt of this letter the envelope was given to the patient of this doctor to play with.

Sanné reports a case where two persons received a note from a friend convalescing from scarlet fever, who wrote she was desquamating so freely she had to brush the dust from the paper on which she was writing. Several days later both recipients became ill with the disease.

It is now universally admitted that calves, horses, cats, fowls and rabbits are liable to a disease nearly identical with scarlet fever and diphtheria. Numerous instances are recorded where these diseases in animals preceded, accompanied or followed an epidemic among human beings.

Dr. Jacobi, of New York, mentions a case: Five children were ill with diphtheria in one house; three kittens that played with them died, and post mortem examinations showed diphtheritic membranes in their throats. Dr. Bruce Low mentions an interesting case: A cat living in the house with a boy that had diphtheria took the disease, communicated it to the cat of another person, and four little girls that nursed the second cat became ill with diphtheria.

Gerhardt has published a case that seems to show that diphtheria of hens may be communicated to dogs and men, notwithstanding the opinions of Loeffler, Pfeiffer and Klein to the contrary. A large number of hens were brought from Verona to a village in Baden; some were suffering with the disease when they arrived, and about half of them died. All the chickens bred in incubators died; four cats kept in the place died of diphtheria, and four of the six men on this poultry farm had diphtheria. In 1885 Dr. C. J. Renshaw described some cases in which cats that had swallowed portions of diphtheritic membrane from human sufferers died of a disease resembling diphtheria.

It is probably true that epidemics of scarlet fever and diphtheria. the sources of which are mysterious, can be traced to cats and dogs. Household pets are well-known marauders. Nocturnal excursions are frequent, and at long distances. Cats especially, because of their domestic habits, have a penchant for visiting neighboring houses, and especially when encouraged, to amuse a sick child.

The transmission of diphtheria to human beings from fowls is affirmed by Gerhardt, Debrie, Menard, Schrevens, and other writers. Cole reports a case in Jacksonville, Ill., where a sick chicken was taken into the house and fondled by a child two and one-half years old. Four days later the child was taken with diphtheria and died. There were no other cases of the disease in the neighborhood, and the affected chicken was the only source of infection.

It is evident from the limited investigations made that diphtheria prevails among fowls to a larger extent than is supposed. Their habits of living, running at random over wide ranges, picking food from garbage and manure piles, render them especially liable to infection. It is a common practice to bring sick chickens into the house for treatment, where children are permitted to handle them, and it is evident this disease is spread in this manner more extensively than has been supposed, and that many cases of mysterious sources of infection of children could be traced to infected poultry.

Dr. Charles McKinnis, of Ollie, reported several cases of scarlet fever in Jackson township, Keokuk county, that illustrate quite clearly the sources of infection. The disease occurred in three families. A sister of one of the families was residing in North English with a family in which scarlet fever was present. She visited two families in the locality above given. In eight days a child in one of the families visited took the disease; in eight days later a second child was taken down; in eight days a third, and on the seventeenth day a fourth one. These four cases were in one family. The doctor does not report the entire number of cases, but while two cases were severe none had died.

In one of these families the source of infection was not definitely determined, but may be readily accounted for since the father is a stock shipper, rides all over the country, and doubtless carried the contagion into his home in that way.

As far back as 1886, Hoffman demonstrated the presence of tubercle bacilli in the bodies of flies captured in a room occupied by a consumptive. The droppings of the flies were full of the bacilli, which were shown by experiment to be fully virulent.

Six years later, Dr. A. Coppen-Jones, of Switzerland, by employing cultures of chromogenic bacteria, proved that infection can be, and actually is, carried, not only in the bodies of flies, but also by their feet. They come from the barn yard and from the reeking corruption of the carcass; they come from the swill pail and from sewage, they come from everywhere and everything that is suggestive of filth and infection. Their feet and legs are covered with morbific matter and they come into the kitchen and crawl over the bread, and sugar, and fruit, and cake, and pie—over everything not securely covered, depositing not only the filth of their feet and legs, but evacuate the contents of their body, which in all examinations have been found laden with bacteria—often of the most poisonous kind! Decency and a due respect for health suggest that money spent for screens for doors and windows, and for sticky fly paper is money well spent.

A source of danger among school children is the slate and pencil. It is a common practice in schools to give the slate and pencil to pupils, without any regard to individuality—that the same child have the same slate and pencil each day. The pencils go from mouth to mouth, while the slates are cleaned with saliva by the fingers, thus conveying to the mouth any bacteria that may be on the slate. Thus, if a child have a diphtheritic sore throat, the disease germ might be conveyed to the mouth of a healthy child.

Library books are also a source of danger. They should never be handled by persons sick with contagious diseases, especially scarlet fever. So impalpable is the dust of desquamation, and the vitality of the disease germ so great that the handling of exposed books after a lapse of years would be dangerous.

Drinking cups in schools are unquestionably a source of infection, especially from diphtheria. Teachers should impress upon pupils that drinking cups should be cleansed and made sterile by the use of boiling water, and the habit which now prevails in schools, railroad cars, stations and public parks of promiscuous drinking from cups never made sterile is a reckless exposure to the contraction of diphtheria and other contagious diseases.

A school water-bucket might easily become infected by immersing a dipper therein direct from the lips of a child just coming down with diphtheria, or who has returned to school during convalescence and before the disease germs were absent from the throat, which may be several days. The frequent changes of water in the bucket would, however, make this danger less than from the use of the cup by a child having an inflamed throat, and drinking from the cup directly after a sick child had used it.

Safety requires that no chances be taken. No child who has had dipththeria should be permitted to attend school until it has been satisfactorily demonstrated that the germs of the disease have entirely disappeared from the throat, not only of the convalescent but of all other children in the family who are attending school. Further, no two children should be permitted to drink from the same cup; each should have his individual cup.

The danger of contracting disease from money is illustrated in the case of Alexander Waltzfelder, bookmaker's cashier at Harlem race track, near New York. He had contracted the habit of carrying bank bills in his mouth, and one day accidentally bit his lip. The wound at once began to swell. He was treated by Dr. Irving, of New York. The wound healed, and a cure seemed to have been secured. Soon after he received a bruise on one leg—a slight abrasion of the skin—while getting on a car. The leg soon began to swell, and he became so ill he was taken to the Presbyterian Hospital, where the physicians diagnosed blood poisoning, the primary cause being the old bank note trouble. Every possible effort was made to save his life, but the disease germs permeated his whole system, and he died.

It is too much to expect that the hygienic principles involved in these suggestions will be thoroughly adopted by the present generation, yet it is possible that the children can be so in doctrinated with the facts of bacteriology that ere long there will be such general use of preventive measures as will very materially aid in the protection of life and health.

RESPONSIBILITY OF PHYSICIANS IN CONTAGIOUS DISEASES.

An extensive acquaintance with the physicians in Iowa warrants a belief in their exalted character, intelligence and conscientious regard for their relationship to the public health, as a whole, but there is forced the conclusion that there are those who, in cases of contagious disease, so far ignore this relation and responsibility as to render them amenable to the criminal law.

With much regret the 'statement is compulsory that there are physicians who seek to secrete the true nature of contagious diseases which come under their supervision, and to mask them under some other name, for the purpose of protecting their patrons from quarantine; and also through fear that others would be afraid to call them professionally if it were known that they were in attendance upon infectious cases.

At the meeting of the American Public Health Association a delegate related the following incident:

> In a certain town, which shall be nameless, there lived two families opposite one another on the same street. There are children in each, the mothers are intimate and dear friends, and a day does not pass that the families are not more or less together. Recently a child in one was taken sick. The attending physician diagnosed the case as scarlet fever, but, as it was a very mild case, said he did not think it worth while to make an alarm by mentioning it. The children of the family opposite, several in number, visited the little sick friend daily, no one dreaming of danger. They all took scarlet fever and one died. The first time the stricken mother met the physician of the first case she upbraided him with, "Doctor, you killed my child." He attempted to excuse himself, but to the mother heart mourning in bitter agony over the needless sacrifice of her child that might have been so easily prevented, there could be no excuse. "Doctor," she repeated, "you killed my child. If you had told my friend that her child had scarlet fever, she would never have permitted my children to enter her house."

So sadly true to life, and so universally applicable were the comments of the delegate from the North Carolina State Board, who heard the recital, they are reproduced here, that every reader, and especially physicians and nurses may profit thereby:

> What an awful accusation! How these words must ring in his ears, and what a pang, if he is not devoid of feeling, the sight or mention of that mother must always bring to his heart!
>
> Now in this case the motive of the physician was doubtless in a certain sense a praiseworthy one—the indisposition to say or do anything disagreeable—but that fact cannot erase the dreadful consequence of his failure to do his plain duty. That the attack was a "mild" one, which was urged as an excuse, was, of course, no excuse at all, for any physician who has learned the a b c of medicine knows that the disease can be contracted from a mild as well as from a severe form, and no man can predict what course the secondary case will pursue.
>
> But the duty of the attending physican to sound a note of warning is not restricted to cases in which the diagnosis is plain. Whenever there is

any doubt about the diagnosis, as, for instance, in a supposed case of roseola where scarlet fever is known to exist in the community, it is clearly his duty to insist upon the observance of every precaution at least until sufficient time has elapsed for desquamation or its absence to settle the matter. He has no right to take any chances when such serious consequences are involved — to stake the comfort and convenience of his patron against the possible loss of innocent lives. And when the diagnosis is practically certain it does seem to us that a failure to promptly take steps — every available means — to prevent the spread of the disease would amount to criminal negligence. It may be considered a rather strong expression, but we hold ourself ready to defend the assertion that any physician who knows that he has a case of contagious disease of a kind liable to produce death and who neglects to have carried out to the very best of his ability every sanitary precaution to prevent its spread *gambles in human life.* How any man can assume the terrible responsibility of a failure to do this simply passes comprehension.

Not only is there a moral and social responsibility, but the physician who for any reason, having recognized the presence of a quarantinable infectious disease in a family, neglects or refuses to give notice to the proper authority, is liable for criminal negligence, and if by reason of such negligence there are other exposures and sickness and death ensues he is guilty of manslaughter.

Quite the contrary, and highly commendable, is the instance of a woman into whose house scarlet fever had entered and who determined that not a suggestion or direction of the health officer should fail of her cordial and energetic support and execution. Promptness, energy and persistence characterized every effort she made to prevent the disease from reaching other people. As a consequence, her three other children escaped the infection and, after a period of maternal anxiety, such as none but the maternal heart can know, her sick one recovered. Subsequently the health officer said to her something like this: "Madam, your child caught the disease through somebody's carelessness or mismanagement, but no other mother's child caught it through yours. So far as you had to do with the progress of this epidemic, it never got past your house; and if everybody would do as you have done, the disease would be quickly stamped out. No failure on your part has filled any other woman's home with mourning."

"Well," said the relieved mother, "what a comfort it is to know that."

In May, 1896, the clerk of a township reported a serious outbreak of diphtheria in his and an adjoining township. An investigation traced the source of infection to a young woman who had come to her home in the township from a town in an adjoining county where she had been employed, and been sick with diphtheria. Before starting she asked her physician "if it was safe to go where there was a family of children?" The physician said to her she could go where she pleased. She had been quarantined sixteen days.

The third day after arriving at her home she visited a family of relatives in another township. Soon after, two children in that family were attacked with diphtheria. On the fourth day children in her own family were taken with the disease. From these cases the disease spread until seven children were carried to the tomb. Some one did a great wrong. When this girl went home it was shown she had a cough and expectorated considerably. The germs of the disease were doubtless in her mouth and throat, showing what has been demonstrated so often, that an early release from quarantine is always fraught with danger. It would seem in this case that the attending physician assumed a fearful responsibility and did an irreparable wrong.

This incident notably evidences the importance of physicians so informing themselves in regard to the nature and danger of infectious diseases, and so conspicuously conforming to the best methods known for the restriction of their spread that the laity, following the advice and practice of these sanitary as well as medical advisers, may be enabled to escape these preventable afflictions.

The legal responsibility should not be forgotten. Can it be questioned or denied that a physician who carries germs of disease into a household and death ensues therefrom is guilty of murder?

This fact alone should be impressed upon every physician who, in the light of the knowledge of the present day, neglects to become thoroughly informed of the teachings of sanitary science and act accordingly.

In the course of a discussion on antiseptic midwifery, before a New York medical society, Dr. Thomas Darlington said that "whenever there was sepsis it came from the physician, not from the patient." Divested of all verbal adornment, it is equivalent to saying that every woman who dies of puerperal sepsis has been in reality murdered by the man to whom she has entrusted her life.

CAUSE AND PREVENTON OF CANCER.

Inasmuch as cancer is one of the most dreaded and fatal diseases to which our country is liable no excuse is needed for, at this time, calling attention to some facts pretty generally admitted respecting its cause and prevention. As to the *cause*, pathologists pretty generally are in accord with the theory expressed by Dr. C. Pittfield Mitchell, *member of the Royal College of Surgeons*, England, in his able treatise, "The Philosophy of Tumor-Disease."

He claims that the difference between malignant and non-malignant growths—between cancers and benign growths, "is is not one of specific nature and causation, but simply one of development and structure." As cancer is essentially a disease of mature, if not advanced, age, Dr. Mitchell regards it as intimately associated with tissue dissolution. He says: "It is because the germs of a tumor are begotten by tissues whose vital powers are nearly exhausted that the germs acquire ascendancy;" that "the process by which tumors are generated is a process conditional upon the decline of tissue-vitality," and that "we must draw the corollary that a tumor is a local disease; local by the derivation of its elements, and local by the conditions of the derivation. Whatever the systemic or constitutional effect of tumor disease, these are secondary, and not primary events." Notwithstanding the fact, however, he says that constitutional or systemic conditions exert an influence upon both the origin and growth of tumors.

One of the most comforting conclusions that Dr. Mitchell arrives at is, that "tumors are not transmitted by descent." He arrives at this conclusion not only as consistent with the proposition above referred to, but as the consensus of opinion as expressed by eminent writers upon this disease. Sir James Paget is most inclined to the theory of transmission by inheritance. Of three hundred and twenty-two cases he thinks twenty-five per cent were attributable to inheritance; Bryant, in six hundred cases, twelve per cent; Gross gives $9\frac{7}{10}$ per cent as the result of his observations; Gussend, $7\frac{8}{10}$ per cent; Sibley and Barker, $8\frac{2}{10}$; Jessett, $2\frac{8}{10}$ per cent; Snow, in ten hundred and seventy-five cases, $15\frac{7}{10}$ per cent.

Allingham, Winiwarter, Holmes, Morris, and Butlin, all are inclined to doubt that heredity has any recognizable influence in producing the disease.

Assuming that our readers, without further argument or quotation, are disposed to regard cancer as a local and acquired disease, rather than constitutional and hereditary, we proceed to consider a very common cause for the appearance of the disease on the lips and tongue—in the mouth and throat; our design being to point out not only a very common, but easily preventable, cause.

Dr. Mitchell, our author, in speaking of cancer of the lip, says: "A very large majority of men suffering from epithelial cancer of the lips are great smokers. In Winiwarter's cases nearly all the patients were smokers; there were only about three who did not confess to this habit. From the Middlesex Hospital Reports we learn that of twenty-four cases in which inquiries were made as to *smoking*, etc., fifteen had been great smokers, and eight, moderate smokers; five of the smokers had chewed as well; one had never smoked."

Of one hundred and sixty cases of cancer of the lip, collected by Mr. Jessett, one hundred and forty were affected in the *lower* lip, five in the upper, and fifteen in both lips. Dr. Mitchell says: "It is an accepted and almost trite fact that the principal cause of lip cancer is the irritation arising from the use of pipes." * * * "The pipe of the smoker rests upon the lower lip, and it is partly owing to the great irritation of the lower lip thus entailed that this structure is the common seat of the disease." He further says that the disease invariably occurred on the side of the lip in which the pipe or cigar was held. He quotes Mr. Jonathan Hutchinson as saying: "There was not a single instance of symmetrical development of the disease on *both* sides of the mouth," in a series of more than one hundred cases, observed by him. Dr. Mitchell adds: "And still more remarkable, in three cases of this series reported by Hutchinson, the disease recurred, after excision, on the opposite side, the original scar undergoing no changes; *but in these three cases the patients held their pipes on the sound side after the operation.*"

He says further: "Of sixty-three cases, only one was in a woman, and of one hundred and sixty cases, only three were in women. Now women, as a class, are addicted neither to smoking nor chewing tobacco, nor are they as intemperate as men." In six cases of cancer of the lip in women, three were in the habit of smoking, and it was not shown that the other three were not. Mr. Pemberton in his "*Clinical Illustrations of Various Forms of Cancer,*" says: "It is remarkable that in the only instance in which I have seen the disease amongst women, the short pipe was the constant companion for seventeen years."

Another location of cancer and its relation to smoking should be considered, viz: Cancer of the tongue, more terrible because less curable than that of the lip. The latter is often cured by excision, the former is seldom operated on until too late.

After stating that in seventy-five cases of cancer of the tongue, it was ascertained that only four patients did not smoke, Dr. Mitchell goes on to say: "It is, I think, a quite warrantable conclusion that smoking is a common cause of cancer of the tongue, and the fact may be at once connected with the circumstances to be explained, namely, that the sides and edges of the organ are the most frequent seats of the disease. The pipe or cigar of the smoker is, with rare exceptions, so held in the mouth that the impact of its point falls not upon the tip, dorsum, root or under surface, but upon the sides and edges." * * * "In the most typical instances it appears about the middle of the front part of the dorsum, but on one side of the middle line, just where the end of the tobacco pipe rests, or where the stream of smoke from the pipe or cigar impinges on the surface of the tongue."

He quotes Mr. Butlin, author of "*Diseases of the Tongue,*" as saying, cancer of the tongue is "incomparably more frequent in males than in females." Jessett says: "In one hundred and ninety cases of cancer of the tongue, one hundred and sixty-three were in men and twenty-seven in women," and Winiwarter states that in forty-six cases forty-three were in men and three in women.

Mitchell, in conclusion, says: "The different habits of the two sexes is the meaning, we may be sure, of the relative frequency of the disease in males and females."

It is not claimed that smoking is the only cause of cancer of the lips and tongue, but by all odds the most frequent cause, much more frequent than all other causes combined.

There are no physicians or laymen of any extended observation but have seen cases of cancer of the lips, tongue or throat; and we venture the assertion that very few, if any, have ever been seen that were not caused by the use of a tobacco pipe, or some agent that has kept up, for a period more or less prolonged, pressure upon, or irritation of the parts affected.

It is not the tobacco so much as the irritation and impaired vitality—"tissue dissolution"—that are produced by the pressure from the cigar or pipe, or by the hot smoke in the mouth and throat that produces the affection. Broken or carious teeth, or the constant pressure from a quid of tobacco, and the irritating effects of strong drinks, also cause the disease.

It may be said, and can be demonstrated, that the same conditions of tissue dissolution produce mammary and genital cancers as well as gastric and uterine tumors.

PREVENTION.

The conclusion is reasonable—that cancer is a disease of "development and structure," intimately associated with "tissue dissolution." If so it is a disease resulting in most cases from clearly discernible and avoidable causes, and hence is largely a preventable disease, and not hereditary as so universally feared.

The design of this article is to point out some of the means of prevention. There is perhaps no disease more dreaded than cancer. It is not only painful and loathsome in many of its forms, but so fatal that when a person is declared, upon competent authority, to have cancer, especially of the internal organs, hope takes her flight, and raven-winged despair takes her place in the bosom of the unfortunate subject.

The frequency with which tobacco smokers are affected, when compared with non-smokers, especially with cancer of the lips and tongue, has already been shown. There are some conditions, such as old age, which greatly predispose to cancer, and which it would not be desirable to prevent. But even old age may greatly reduce its risks from this disease.

Dr. Mitchell, in his able work, "The Philosophy of Tumor Disease," says: "That tumors are not of spontaneous origin, but acquired, is established by two bodies of evidence, the facts as to causation, and the argument from heredity." * * * We have seen that there are no grounds for believing that tumors are or can be inherited. Thus we are prepared to surmise, in opposition to current opinion, that tumor disease may not be wholly unpreventable.

Because any disease may not be *wholly* prevented, is no good reason why it should not be prevented as much as possible.

He says further: "Diseases are prevented by avoiding and removing causes. The most effective of the causes of tumors in general are avoidable and removable."

Speaking of age as a predisposing cause he says: "We are led to think that age alone will sometimes be efficient. It rarely happens, however, that some special cause is not superadded. * * * Age is decided not only by the years, but also by the life that has been lived. The cancerous tongue of a man of thirty-five is older than the healthy tongue of a man of eighty. In thinking of age as a cause of tumor disease, we must have in mind the number of years in relation to the life experiences of the organism, and therefore in order to diminish the favorableness of advancing years, both the local and the general life of the tissues should be carried on without undue waste of those powers through which the individualities of the whole and its units are maintained. *Hence it appears that while age as a predisposing cause of tumor disease is irremovable, it is yet possible to increase or weaken its force.*"

Taking up the consideration of tumors in special localities, and the means of their prevention he says: "Nowhere else in the body is the prepotent influence of local irritation over all other conditions as clearly and conclusively shown as in cancer of the lips. Without the use of the pipe, and without other local circumstances, competent to exhaust the local contained life, energy of the tissues, the general and predisposing conditions, we may conclude, be entirely nugatory."

In regard to cancer of the tongue, he says: "Abstinence from, or the strictly moderate use of tobacco and alcohol, and the avoidance of every other source of lingual irritation, would, with the greatest probability, prove completely preventive."

In speaking of cancer affecting other portions of the alimentary canal he says: "We have seen how intemperance is probably the chief inciting condition of cancer of the pharynx, œsophagus and stomach. It seems impossible to doubt the preventability of these diseases, and that future research into their causation will show them to be rigorously dependent on violation, often gross and persistent, of rational dietetics."

In regard to cancer of the breast, so common in women, he attributes it largely to physiological bankruptcy caused by prolonged excessive nursing, and other sources of local irritation. He says: "With the evidence before us of the part which destructive inflammation of the breast plays in the genesis of cancer, prevention of such inflammation assumes great importance. And here, it will be remembered how very often the perversions of mammary function, associated with depressed nipples, are succeeded by cancer; and how depressed nipples may in turn be traced to the pressure effects of the corset."

But space prevents the further pursuit of this subject in detail.

It is well to repeat that Dr. Mitchell's theory of the cause of tumor disease is that of "histogenic dissolution," a perversion, a pathological tissue-change induced measurably by local irritation. The pipe or cigar produces cancer of the lips or tongue, not so much because of any chemical or therapeutic action of the drug, but because of the pressure of the pipe and the cigar upon the lips or against the tongue, and the irritation of the smoke in the mouth leading to "histogenic dissolution." Dr. Mitchell's philosophy of tumor disease is not only the most rational, but the most hopeful that has been presented. If by any measure fifty or seventy-five per cent of these cases can be prevented, it is well worth the trial. These facts should lead to a thoughtful and faithful avoidance of those practices that mostly lead to such disastrous results.

GLANDERS IN A CHILD.

In June, 1897, the following case of glanders in a child was reported by Dr. F. J. Smith, at Alton, in Sioux county.

ALTON, Iowa, June 18, 1897.

Dr. J. F. Kennedy, Des Moines, Iowa:

DEAR SIR—I have a case in a child that seems to me to be chronic farcy. The child is three years old. So far as known the child has not been exposed, but there have been a number of cases of glanders in horses in that neighborhood. The child has been sick now about three months; is cachectic in the extreme, though it appears to look a little better than formerly, and gaining strength somewhat.

There have been sores and boils forming all over the little one's body, but most of them on the fingers and toes. There would first be some erythema, then inflammatory swelling, which increased till finally the mass would break down and a deep slough would result exposing tendons, bones, etc. The smell of the pus was very offensive, a mawkish, sweetish sort of a smell, something like gangrene, yet not the same. One toe dropped off altogether, the others were all sore and ulcerated, and at their bases the ulcers extended almost to the bones. These sores are all healing now, but there is a tendency for them to return and break out anew.

The buccal mucous membrane, tongue and lips were literally one large ulcer, with a foul smelling discharge. There was a bronchitis, laryngitis and nasal and post-nasal catarrh. The laryngitis was so bad that for a while she could not articulate, but that is better now. The bronchitis was for a little while about gone, though now there is a return of the same.

There have been swellings about the face, back and abdomen, some resulting in abscesses, others gradually disappearing without the formation of pus.

Have you not the authority to order up some one who has seen chronic glanders in a human being, and who could positively affirm or refute my diagnosis? If you have no authority to do so, or no funds at your disposal for that purpose please let me know, and then also let me know what to do, as the case may be a menace to the public health, and ought to be quarantined if it is chronic farcy. The people are very poor, so they can not do anything.

Yours respectfully, FRED J. SMITH, M. D.

ALTON, Iowa, June 25, 1897.

Dr. J. F. Kennedy, Des Moines, Iowa:

DEAR SIR—The child I wrote you about has died. The bronchitis that was slightly worse again when I wrote you, kept increasing until Wednesday, when the little one died. Dr. J. I. Gibson, State Veterinary Surgeon, came, but too late. He agreed with me as to the nature of the disease.

Your suggestion as to scrofula and syphilis had occurred to me before, but a fair trial of anti-syphilitic remedies did no good, nor did any remedies directed to the scrofulous condition seem to help. I have not the slightest doubt any more as to the nature of the disease.

The glanders poison in this case was evidently introduced into the system through the stomach or intestines and an attack of "lung fever" followed by an attack of the "grippe" was probably really the breaking out of the disease, for it was right after that that the local lesions made their appearance, and which were at first confined to the fingers and toes, soon appeared on the back, neck, arms and legs. The whole mouth was raw and some of the teeth fell out, the gums having a gangrenous appearance in places, the face was swollen, especially on the right side, the larynx and bronchia were implicated and so were the nares. I was speaking with a veterinarian who had seen glanders in the human being in Europe in cavalry men, and he described cases to me. From his description I judge that my case was just like some of the cases he saw. At any rate I have not the slightest doubt as to the case being one of glanders.

Fraternally yours,

FRED J. SMITH, M. D.

FOOD POISONING.

IN DES MOINES.

In August, 1896, three or four families, containing nearly twenty persons, in the city of Des Moines, purchased some prepared beef of a local butcher. In a short time, varying from a few minutes to two or three hours, all the parties eating of the meat became very sick—having great nausea, excessive vomiting, frequent passages from the bowels, and very great prostration. Two or three were regarded for some time as in a very critical condition, some soon recovered, and all finally got well.

A careful personal investigation was made of the method of preparation of the meat and of its effects upon those using it. The following facts were elicited: The meat consisted of scraps of beef that had been in "pickle" or brine for from a week to ten days. It was taken out of the brine in the afternoon of July 17th and boiled until it was tender enough to be picked apart. After being picked apart and all bones removed in the evening (Friday) it was put into an iron cylinder press with an iron cover. There was a thin cloth lining the cylinder and underneath the cover to prevent contact with the iron.

It was subjected to hard pressure all of Friday night, and Saturday forenoon was put on the counter as a body and sliced off as sold. Quite a number of persons bought of it at various times on Saturday; some was sold on Sunday and Monday forenoon. None of the persons to whom it was sold up to Monday noon, July 20th, manifested any signs of poisoning. Monday afternoon four or five sales were made, going into as many different families. So far as could be learned all the persons in these families who ate of the meat had the violent toxic symptoms above stated, while other members of these families who ate at the same tables, but did not eat of the meat in question, escaped. The temperature from the 18th to include the 20th, was seventy-three degrees, eighty degrees and eighty-four degrees, respectively, with a good deal of moisture in the air.

The symptoms were significant of tyrotoxicon poisoning, and the long exposure of the cooked meat during the hot weather was highly favorable to the development of this ptomaïn. Specimens of the meat were sent to Professor Vaughan, of Michigan University, Professor Rockwood, of the Iowa University, and Professor Macy, of Highland Park College, Des Moines, for investigation.

Professor Rockwood reported that he had not been able to find any ptomaïnes or tyrotoxicon in the sample sent him. He further said: "Not being successful I made two extractions, injecting the resulting product into young rabbits with no apparent inconvenience to them. It is quite possible that the meat might have contained ptomaïnes, and they have changed before the analysis to harmless compounds. We know that many of them are extremely unstable."

Professor Macy reported as follows:

Dr. J. F. Kennedy, Secretary State Board of Health, Des Moines, Iowa:

DEAR SIR—I beg to report as follows upon the investigations of the poisoned meat submitted to me for examination some weeks since:

The examination was first delayed because the college was changing hands and the laboratories were not supplied with water, and could not be used. When the laboratories were opened I made an extraction and obtained chemical evidence of ptomaïnes, but could not obtain it in quantity; nor did I try a physiological test at that time, because of the absence of a suitable subject; but about a week later I obtained a small kitten and then made another extraction. This time I failed to obtain even chemical evidence of ptomaïnes. I think that had there been ptomaïnes present when the meat was eaten by the parties who were afterward taken sick; that by time and exposure it would lose all the ptomaïnes through their decomposition. Professor Vaughan cites two cases where tyrotoxicon was known to be present and the entire quantity disappeared in a very few hours upon exposure to light and air. In all such cases it is absolutely necessary that the meat or milk be kept in a cool, dark place, if it cannot be analyzed at once. In this way only, can the decomposition be prevented.

If I am correct, the meat submitted to me for examination had been exposed to air and light at various times before it was delivered to me. This may account for the disappearance of the ptomaïnes.

Very respectfully, S. R. MACY.

THE SABULA CASE.

Dr. R. A. Crawford, of Miles, has furnished a clinical history of the remarkable Sabula food poisoning epidemic referred to on page 6. It is an interesting and noteworthy case.

The most extensive and serious outbreak of food poisoning ever recorded in the history of Iowa, occurred in the eastern part of Jackson county, in the fall of 1895. On September 11th, at a farm house three miles from

Sabula, there assembled about three hundred guests to witness a marriage ceremony and partake of the good things provided for the occasion. Within a few weeks thereafter, over one-third of the entire company were sick and seven deaths had occurred.

That the disease had its origin at the wedding could not be doubted, as there was absolutely no serious sickness among the scores of families who were not present on that occasion, nor had the health of the community been better for years, than during the month preceding the epidemic. The house at which the wedding occurred is well located, and there is no history of disease having existed there for many years. The water supply was drawn from a deep well drilled in the rock and so located that drainage or surface water could not contaminate it. The well was in constant use by the family and servants, while all remained in their usual health until after the wedding. An effort was made to show that the disease had been carried to the wedding by some guests from a distance, and that the crowded rooms and heated atmosphere favored the rapid spread of the virus. That it was not thus carried is shown by the following facts:

First.—No such disease existed at the home of any of the guests.

Second.—No case occurred among the scores who were engaged in caring for the sick, during the five weeks following the outbreak, excepting such nurses as had also been wedding guests.

At the beginning of the sickness the writer was strongly impressed with the idea that the food was the source of infection, and as his investigations advanced he became fully convinced that such was the case. When the first few cases were seen it was thought we might be dealing with a late manifestation of ptomaïn poisoning, but as the cases continued to come down, this theory was seen to be untenable. It soon became evident that the disease was the result of the ingestion of food infected by some pathogenic micro-organism, the exact nature of which was yet to be determined. No examination of the food could be made, as the first cases did not come under observation until one week after the wedding, but the testimony of the guests was such as to convince the most skeptical that the meats were not in prime condition. The ham was served in sandwiches, and, I have reason to believe, was thoroughly cooked. The turkeys were killed the day preceding the feast; some of them were cooked the same day they were killed, while others were kept in the cellar until the next day, and then baked in the oven. The chickens were killed the day preceding the wedding, cooked in the usual manner, and as soon as cool enough to be handled the meat was removed from the bones, chopped, and placed in common earthenware jars. These jars were set on the cellar floor and allowed to remain there until brought up to be served, more than twenty-four hours afterward. The servants state that no ice was used about the meats, and that the cellar was badly infested with flies. The weather was extremely hot, the mercury ranging between ninety and one hundred degrees, Fahrenheit. The pressed chicken was too soft to be sliced, so when served had to be dipped out of the crocks with a spoon. That the chicken was undergoing decomposition, the following letter from one of the guests, a man of unquestioned veracity, would seem to establish beyond doubt:

DEAR SIR—The general, and I think I may say the universal, comment here is decidedly against the food, and I believe that most of them would so testify on the stand.

My own experience is this: I put a piece of the chicken, or at least what I supposed was chicken, into my mouth, and it was so absolutely filthy, slimy and putrid to the taste that I spit it out and ate nothing else.

I might add many more such statements, coming from the most reliable people in the community, including the officiating minister and his wife, but this is unnecessary. That some of the guests detected nothing wrong with the meat I am free to admit, and the only explanation that can be offered is that it was not all equally bad. A few of the sick denied having eaten any of the meats, but these exceptional cases may be explained by the contamination of other articles of food and drink.

An effort was made to direct attention to the ice cream as the probable source of infection, but a careful investigation failed to sustain this claim. The cream was furnished by a vendor in Sabula, and as only a part of the quantity prepared was sent to the wedding, the remainder was disposed of to parties in the town, all of whom remained well.

A peculiarity of this epidemic was the great variation in time between the ingestion of the food and the first symptoms of disease. A careful study of forty-five cases, most of which were under the writer's care throughout the entire period of their illness, gives the following data: Of the cases, fifty per cent came under observation between the fourth and tenth day after the wedding. Almost all of these began to feel ill on the fifth or sixth day, but many of them were able to continue their vocation for a week longer. Three taught school for a week after the first symptoms appeared. Between the tenth and twentieth day, thirty per cent more came down, while the remaining twenty per cent continued in their usual health until between the twentieth and twenty-eighth day. Those that became ill during the third and fourth week were apparently as severe cases as those that were taken sick earlier. In seventy-five per cent of the writer's cases, the highest temperature was reached on the first or second day after coming under observation. The average temperature, when first seen, was $102\frac{8}{10}$ degrees Fahrenheit. The highest temperature reached was $105\frac{4}{10}$ degrees Fahrenheit. The average duration of the fever was eighteen days from the date of the first visit. The mildest cases were feverish for a day or two only, while in the most severe cases the temperature did not reach normal for forty days. Over twenty per cent of the sick were not confined to their beds, but assisted in caring for those who were more seriously ill. A few of the mild cases were apparently as well as usual in ten days, but the larger number remained weak and miserable for a much longer time.

The appearance of the tongue varied in different cases, and in the same case at different stages of the disease. In most there was a heavy white coating; in others it was brown, while in some it was denuded of epithelium, and was dry and cracked. Of a few patients, the tongue was so swollen as to make speech difficult. A fecal taste was complained of in some, and I found the patients scraping the tongue with a knife to get rid of this very offensive symptom. Vomiting was present in fifty per cent of the cases, while it was very persistent and troublesome in about ten per cent. Diarrhœa was present in about thirty per cent of my cases, the passages being mostly of a greenish color and a very offensive odor; but constipation was the rule, and laxatives or enemas were often called for. Tympanites was not a prominent symptom, and in but a few cases required treatment. Hemorrhage from the bowels was not met with in any of my cases. Epistaxis was noted in eighteen per cent. A rash was present in six cases out of the forty-five. In three of these, only two or three spots were discovered, while in the others the rash was more abundant and characteristic. Profuse sweats were a striking feature of the disease, and the odor was so extremely offensive that frequent changes of clothing were necessary for the comfort of the patients. In fifteen per cent of the writer's cases, delirium was present, but in most of the cases it was of a mild character and of short duration. In the fatal cases this symptom was constant toward the last. No serious pulmonary complications occurred, and only in a few cases was cough a troublesome symptom. Pain was the most prominent symptom in seventy-five per cent of the cases. Some patients located their pain in the region of the umbilicus; others suffered but little from abdominal pains, but intensely from pain in the muscles of the extremities. The writer saw cases where the arms were almost as useless as if paralyzed and were exceedingly tender to pressure. In one instance, he found the patient with mustard drafts upon the forearms, so intense was her suffering. Swelling of the muscles was noticed by some. Dr. Pettit of Cedar Falls, who had two of the victims under his care, reported such a case to the writer. Hypodermics of morphine were necessary to control the pain in a number of cases.

The mortality was six per cent. All the fatal cases were under thirty years of age and four were between fourteen and twenty. Two deaths occurred in the third week, three in the fourth, one in the sixth and one in the seventh. The last death was from perforation of the bowels. There was evidence of profound toxemia in all the cases that proved fatal.

In two cases post-mortem examinations were made under the supervision of the President of the State Board of Health. The first body examined was that of a girl of fourteen years, who died about the end of the third week. The following is a brief history:

L. W., aged fourteen years. Always enjoyed good health. She was taken sick the fourth day after the wedding but continued in school a week longer. She consulted me six days after she began to feel bad, when I found her temperature one hundred and three degrees, pulse one hundred and thirty-four. She complained of very severe pain in stomach and bowels; pain in eyes; general aching; nausea, etc. Between this and the date of her death sixteen days later, the temperature ranged between one hundred and two-tenths and one hundred and four and two-tenths degrees, often fluctuating two or three degrees in twenty-four hours, but with no regular curve. Constipation continued until the last week, when a very troublesome diarrhœa set in. The passages were of a slimy character, green color and very offensive odor. Hypodermic injections of morphine were necessary to give relief from the severe abdominal pain. The immediate cause of death was progressive heart failure, the result of the profound toxemia.

At the post-mortem examination the heart and lungs were found to be in a normal condition. The liver was decidedly enlarged, soft and lighter in color than usual. There was some enlargement and softening of the mesenteric glands and ulceration and softening of the cœcum. The mucous membrane of the colon, for three inches below the cœcum, was found to be injected and softened but showed no ulceration. The kidneys were healthy; the spleen enlarged, softened and very friable. The stomach presented evidences of inflammation throughout, but no ulceration. The duodenum was normal in appearance and pancreas healthy.

Portions of the various organs and of the muscular tissue were sent to the State bacteriologist and to Chicago for microscopic examination.

The second case was that of a young man of eighteen years of age, who had been sick for six weeks. During the third week his temperature declined to a point but little above normal, and it was thought that he would soon be out of danger. A severe nervous shock occurred at this period, and his temperature soon rose to one hundred

and four and two-tenths degrees and continued high until death. Early in his sickness he suffered considerably, but after the relapse he did not complain of anything. Delirium of a mild character continued during the closing weeks.

The post-mortem examination showed the heart and lungs to be in nearly normal condition. The liver was enlarged as was also the spleen. The cœcum and colon were ulcerated throughout their entire length, but there were no perforations. In the small intestine there were patches of inflammation but no ulceration.

Sections of the muscular tissue and of the various organs were sent to the State Board, to Dr. Le Count, of Chicago, and to Dr. Hildreth, of Cambridge, Mass , for microscopic examination.

The report of Dr. William Royal Stokes, of the Boston City Hospital, who examined the specimens sent to Cambridge is very full and complete. His anatomical diagnosis is as follows: "Typhoid fever; broncho-pneumonia; general infection with the pneumococcus."

This report is in harmony with that made to the State Board by Professor Bay.

Dr. Le Count reported embryonal trichinæ, when the specimens from the first case were sent him, but undoubtedly failed to find confirmatory evidence from his examination of the second, as he made no report.

Late in the Fall the writer treated ten cases of typhoid fever, all of which occurred in families where one or more of the wedding victims resided. Nine of the patients were taken sick between the sixth and ninth week after the outbreak, at a time when nearly all of the other sick were convalescing. All these were typical cases of typhoid—no symptoms being wanting—and were in striking contrast to a similar group of the wedding victims. But two cases were seen outside of these homes, during the succeeding six months, so that no doubt could exist regarding the source of infection. If we accept the conclusion that the malady was typhoid, we must admit that it was a very peculiar manifestation of the disease. One of the leading physicians of Clinton treated three cases as remittent fever. Two other physicians, after seeing a number of cases, independently reached a diagnosis of trichinosis. Dr. Le Count, of Chicago, assured the writer there could be no doubt about the epidemic being one of trichinæ poisoning. Dr. Pettit, of Cedar Falls, had two cases under his care and reached the same conclusion. Two of the local physicians made a diagnosis of relapsing fever, while others preferred to wait until the evidence was all in before making a positive diagnosis. Some of these physicians have treated scores of cases of typhoid during the past twenty years, and it seems strange that they failed to recognize the nature of the malady. If the specific bacillus of Eberth is insisted on as being essential to the production of the disease, it remains and must ever remain a mystery, how the meats became infected therewith, as there had not been a case of enteric fever in the community for nearly a year prior to this outbreak.

The treatment, it is needless to say, was determined largely by the diagnosis.

A number of communications were received from Sabula and the surrounding country suggesting probable causes for this outbreak of the disease.

One of the causes emphasized by several, was an alleged condition that might easily account for the typhoid infection.

It was stated that the prepared chicken after being placed in jars in the cellar was for some time exposed to a visitation of flies. It is well known that flies are great scavengers. They are active, and often in a short time travel miles in search of desirable food. It is very possible and, if the alleged facts are really true, it is highly probable that some of the visiting flies may have been fresh from the dejecta of some typhoid fever patient, and thus by their infected feet, and their own discharges, have deposited the germs which under the favorable conditions of excessively hot weather, and the moisture of the meat, would soon infect a large portion of the food. Some portions would doubtless escape contamination, and thus some of the guests might partake of the meat and yet not realize any bad effects.

Attention is called to an extract from the *Public Health Journal:*

> Two cases of poisoning from decomposing animal food have recently occurred in Michigan ("*Mod. Med.*"). Both cases were reported to the State Board of Health, and placed in the hands of Professor Vaughan, superintendent of the laboratory of Hygiene at Ann Arbor, for investigation.
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> In one of these cases a number of persons residing at Somerset Center, Hillsdale county, were poisoned by eating dried beef. Professor Vaughan reported at the last meeting of the State Board of Health that he found on investigation that the meat contained a small germ, which, when injected under the skin of rats, guinea pigs or rabbits, produced death in twenty-four to forty-eight hours.
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> In the other case of poisoning, which occurred at Sturgis, two hundred persons who ate of pressed chicken at a banquet were poisoned. The bacteriological study of the sample of chicken sent for investigation showed that it contained germs which, when injected into guinea pigs, produced death, although they were not sufficiently virulent to kill rats.
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> Cases of this kind are becoming more and more frequent, indicating very clearly that persons who use preserved flesh food must, under all circumstances, use extraordinary care to avoid serious or even fatal poisoning.

Dr. J. Dixon Mann, F. R. C. P., in the *British Medical Chronicle*, in an elaborate article on meat poisoning, says: "Meat may become poisonous in three ways; from the presence of disease in the animal at the time of slaughter; from micro-organisms which attack or develop in meat after slaughter; and from the presence of ptomaïns. With the first two classes there may be a considerable period of incubation between the eating of the food and the commencement of symptoms; in the other class there may be a prolonged period of incubation, if the meat after slaughter has been invaded by pathogenic micro-organisms. The author groups the symptoms produced by poisonous meat in two divisions—those due to a true infection and those due to simple poisoning. In the first division the symptoms run the usual course of an infective disease. A case is recorded by Walder (*Inaugural Dissertation*, Leipzig, 1879) in which six hundred persons were attacked after eating the flesh of a calf which was killed when moribund; the symptoms comprised headache, anorexia, photophobia, delirium, meteorism and enlargement of the spleen and the inguinal glands. Six died, the post-mortem appearance being that of typhoid fever. In the second group the symptoms usually resemble those of gastro-enteritis, with subnormal temperature; sometimes the temperature is elevated. Some toxins produce special symptoms. An atropine-like base has been described by Anrep (*Arch slaves de Biologie*, 1886) as having been met with in decomposing meat, most frequently in the sausages largely eaten in Germany, and in certain kinds of fish, as sturgeon. The toxin contained in the same meat may cause different symptoms in different people. An instance is related of ninety-seven persons who ate the meat of a cow which, when slaughtered, was ill of hemorrhagic enteritis. They were seized with symptoms like cholera, within four to forty-eight hours. Nearly as large a number ate of the same meat without any ill effects. It is to be remembered that some animals are insusceptible to some toxins. Gartner (*Thuringer arztliches Correspondenzblatt*, 1888) examined some beef derived from a diseased cow, which had caused an outbreak of meat poisoning, and found in it characteristic bacteria. Dogs and cats ate of the meat without being affected, while rabbits, mice, guinea pigs, a horse and a goat were made ill by it, some dying. It has been observed in several cases that if the flesh of an animal, in a certain stage of septic disease when slaughtered, be eaten shortly afterward, there may be no ill effects; but if kept for several days it becomes toxic, producing the usual symptoms of meat poisoning in those who eat it. Meat may be infected with bacteria after it has been cooked, as well as in the raw state. In some cooked meat which had been kept in an ice-safe *B. proteus vulgaris* has been found, these micro-organisms having been previously present in the safe. Foster (*Centrablatt fur Bacterioligie*, vol. XII) has shown that certain bacteria not only live in melting ice, but also grow in it. The temperature of an ice-safe is usually several degrees above the freezing point; hence some of the putrefactive bacteria, if accidentally introduced into the safe, may multiply and contaminate the meat. The percentage of deaths is difficult to estimate, as the number of persons attacked is frequently not stated, the fatal cases only being recorded. The wide variation in the mortality of outbreaks is very striking—ranging from twenty-six per cent down to zero. The table given in a recent number of the *British Medical Journal* (1894, vol. II, p. seven hundred and twenty-five) shows a mortality of about 4$\frac{3}{10}$ per cent. Regarding the preventive measures relating to meat poisoning, the author especially advocates a stringent supervision of the lower class butchers, particularly in large towns, who are apt to buy diseased and even dead animals, which are converted into meat and sold at cheap prices to the poorer classes. In private houses the cellars, larders, and all places where meat, cooked or uncooked, is stored, should be kept clean, dry, and well ventilated; they should have no communication, direct or indirect, with drains. The author calls attention to the danger of buying meats already cooked, such as potted meats; these being cooked in large masses there is danger that the heat which ordinarily applied in the cooking process will kill disease germs, has not in these large pieces reached fully and equally every part of the meat—an objection of especial force if spores be present, as they are more resistant than the micro-organisms themselves."

HYGIENE AND HEALTH IN PUBLIC SCHOOLS.*

Dr. G. Stanley Hall has said: "What shall it profit a man if he gain the whole world of knowledge and lose his health?" In our public schools, especially in the high schools, many a promising young life has been sacrificed by over-study. The system of marks and medals, now happily disappearing from many of our best schools, has driven many an ambitious boy and girl to an early grave at the point of a pencil, because that system stimulates those very pupils who need no spur and whom the spur injures. More frequently the health of pupils is injured by ignorance of the most obvious laws of health, or by criminal neglect of those laws, and by the impure air of schoolrooms. Unsuitable furniture which cramps and distorts the growing bodies of children, and poor light which impairs the sight, have also a long account to settle with children thus ruined for life.

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* Prepared for the Committee of Twelve on Rural Schools of the National Educational Association, by A. P. Marble, of New York City, 1897.

The evils of unsanitary schoolhouses have attracted most attention in the crowded schoolrooms of cities, but these evils are not confined to densely populated places. They appear equally in the rural districts, and they are less known only because the cases of injury are scattered, and the statistics are less easily obtained.

The vigorous country boy and girl may for a time resist the evils of a schoolroom, alternately too hot and too cold; of drafts of cold air in Winter through cracks in the floor and poorly-built walls; of outhouses too filthy for use and sources of moral defilement; of seats and desks, built for cheapness and not for comfort, and more like racks for torture than like a proper resting place for the growing bodies of little boys and girls. But however much the injury may be concealed, the deadly work goes on in many a country school. Take a single instance. Many a man has suffered for years from hemorrhoids brought on by ignorance or neglect in childhood; neglect, because proper accommodations were not provided or not properly cared for at the schoolhouse; ignorance, because the school gave no instructions in hygiene — not the technical hygiene suitable for physicians, but the obvious, ordinary hygiene that relates to clothing, proper bathing, eating, and the excretions.

Physiology is now required by law to be taught in the schools of nearly all the States. As too frequently taught, it concerns itself about the chemical effects of certain substances upon various parts or processes of the body. Such a treatment of the subject is too abstruse for children in the schools, it goes beyond their knowledge and their experience. They need to be taught the effect of green apples upon the stomach before they are taught the effect of alcohol upon the brain. We ought to learn wisdom from the concrete teaching of nature about eating green apples in her monitory pains. People mean well when they teach the evil effect of alcohol to little boys and girls who do not know what alcohol is. It would be better to teach these children the good effect of wholesome food and drink, and especially to teach them that the whole alimentary canal should be kept in healthy, regular, and daily movement throughout, and to teach this and all that relates to the necessary bodily functions with delicacy and propriety, and without any squeamishness. Is any teacher too delicate, cultured, and refined a lady or gentlemen to give this instruction concerning the bodies of the children? Then let them be relegated to the land of spirits, to teach where the mortal coil has been shuffled off. It is high time to inaugurate a campaign of hygiene, and not the least important branch of child study is the study of their bodies, and how those bodies may be made in school to grow strong, robust, healthy, natural, at ease—"the temple of the living God."

In making the many advancements in education in recent years the pedagogical literature of the past three hundred years or more has been ransacked, and the educational philosophy of many eminent and venerable teachers has been exploited to constitute the new education—Comenius, Pestalozzi, Froebel, Herbart, and the rest: it is worth while now to bring to the front the maxim, "Mens sana in corpore sano," and to found an educational philosophy on that. Already we have physiological psychology which seeks to trace mental phenomena through a study of the brain, and missionaries are now learning to convert the heathen by making their bodies comfortable without their eating the missionary. Benevolence now seeks to raise humanity, both intellectually and morally, by first improving men physically. Let the schools follow the lead of philosophy and of religion in this regard.

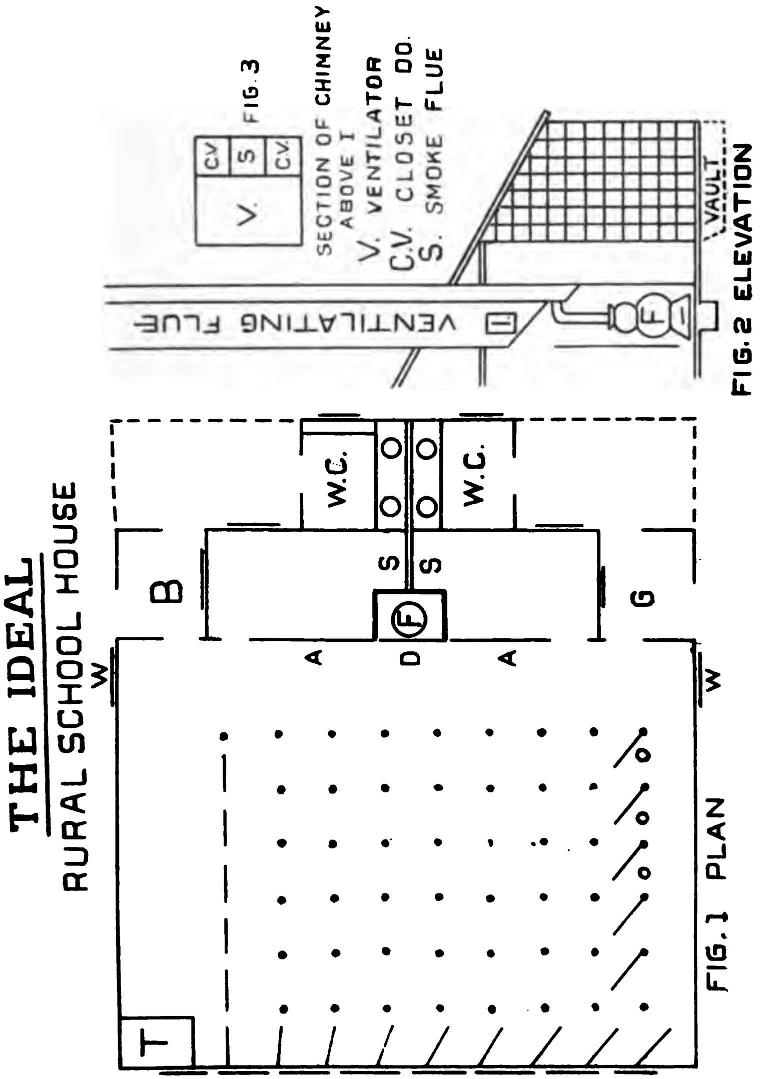
It is well known that no child can learn well or grow mentally when in bodily discomfort. Dullness, uneasiness and consequent disorder in a school, are directly traceable to vitiated air. If the body is numb with cold, if the feet are damp and chilled, the mind becomes stupid; and the sweltering heat of a badly ventilated schoolroom, the uneasiness of an over-loaded stomach, of constipation, and of uncomfortable clothing, will produce the same result. Moreover, an abnormal condition of the body is often the source of immorality. We blame the first Adam too much; the real Adam is nearer home, and of this generation and every generation that neglects the laws of health. The out-buildings of ill-governed schools with ill-taught children sometimes give evidence of fearful demoralization, and the demoralization is contagious, like a plague.

An important part of school hygiene, then, relates to the lavatories or water-closets. This is not the only, nor perhaps the most important, part of school hygiene, but it needs emphasis most at present, because it is nearly always neglected. In rural districts the outhouse is generally located in a remote part of the grounds, where its offensiveness may not interfere with the school, and it is the prey of tramps and bad boys who delight in defiling it. The closet should adjoin the schoolhouse, and be accessible through the house only. This location would compel its being kept inoffensive, and make it easy to do so. It should then be used by every child with the same freedom as at home in a well-regulated family. And the child should be taught in school to respect his body in every part and in all its functions—that nothing about it is defiling unless he himself makes it so; and that, while we are animals, we should be rational animals, and not brutes. Such teaching should not be indelicate nor obtrusive; but it is important, because respect for the body is at the foundation of self-respect and true manliness. This special teaching of hygiene has often been neglected through a false modesty which is highly indelicate, and which is itself the evidence of an impure mind.

For health, for comfort, and for intellectual and moral well-being, the schoolhouse should be well-constructed and suited to its use. It should stand in the middle of the grounds, high, well drained, and ornamented with trees and shrubs. The well should be so located as to supply pure water. The architecture should be simple and show a refined taste, for the schoolhouse is an educator. It should be as convenient and as well built as the best homes, in order that the children of the well to do may not despise it, and in order that the children of the poor may see how the best people live. The schoolhouse will thus become an inspirer in the young to higher living, for education is more than learning from books. It is a training also in how to live.

Churches are built as an example of noble architecture, to be an object lesson leading upward to a higher life. They are usually grander than the houses of the worshipers, and the poorest man in the congregation has an ownership in them. Municipal and state buildings often display, or are meant to display, the community's ideal of a home for itself. And so the schoolhouse should exhibit the taste, and to some extent the aspiration, of the neighborhood. It should be a little better than the best dwelling house.

Below is an attempt to show the least that should be tolerated in any community where the Americans of the future are to be educated. The ideal room may be repeated in a single building to any number below sixteen or twenty.



This plan provides for forty-eight pupils—one desk and chair in each of the squares, 3 feet by 3 feet, indicated by the dots. The desks at front are at right angles to the wall, and each succeeding desk toward the back is at a greater angle than the last, till about forty-five degrees is reached at the last. The teacher's desk is at T, in the left front. The surface of the floor is 720 square feet, or 15 square feet each for forty-eight pupils, which is the least allowable. If the room is 13½ feet high its contents are 9,720 cubic feet, or 200 cubic feet each (the regulation number), and only 120 cubic feet for the teacher when all the pupils are present.

FIG. 1. This represents a schoolroom 24 feet by 30 feet, with (B) boys' entry and (G) girls' entry. The entire south side has a series of windows as near each other as the construction will permit, and extending to within three or four feet of the corners of the room. These windows should be three or four feet from the floor, and they should extend entirely to the ceiling of the room. Only the two outer ones need to be built so as to open. In cold climates all the windows should be double.

Near the entry door, both on the boys' and on the girls' side, another door leads into the cloakroom, which is 11 feet by 6 feet in size, and each cloakroom is provided with a sink (S) and two windows, five feet from the floor, one looking into the entry opposite a corresponding one above the outside door, and the other looking into the back piazza. The last of these windows must be stationary; the one looking into the entry may be open in Summer, but never in Winter, for a reason that will appear later.

From the entry on each side of the house another door opens backward upon a piazza accessible in no other way, and enclosed with heavy lattice-work (shown in Fig. 2) or stout wire screens, and from this piazza a door leads into the closet, which is provided with a single window protected by heavy screens.

Each vault must be built as nearly air-tight as possible (preferably of brick), must be connected closely with the under side of the floors, and must have a ventilating pipe of galvanized iron leading from the end of the seat at the top and entering a separate flue in the chimney next to the smoke flue, as seen in Fig. 2.

The furnace, F (Fig. 1 and Fig. 2), has a large stove, with 10-inch fire-pot (if for coal), enclosed in a brick chamber, some 3 feet by 3 feet, from which a door opens into the schoolroom. This door is six or seven feet high and three feet wide, and is very carefully protected on the inside with tin, or better, it may be made of tin or sheet iron. Above this door is a transom, three feet wide and two feet high, either open entirely or filled with a screen of light wire and large mesh, and from the top of this transom and within the chamber or furnace a sheet-iron partition or diaphragm slopes backward, at an angle of about forty-five degrees, to back side of the furnace.

Below the stove, and in the bottom of the furnace, is an opening 2 feet by 2 feet, connecting with a fresh-air duct of the same size, that extends beneath the floor to the outer walls beneath the outside steps, where it must be covered with a wire screen and be protected from the dust.

The tin door of the furnace being closed and the stove heated, the air becomes rarified, rises to the top, is deflected by the slanting partition or diaphragm, and enters the schoolroom through the transom. At the same time the fresh air is supplied to the bottom of the furnace through the duct described above. This duct should be supplied with a valve by which it may be closed if necessary. The smoke flue of the stove is shown in Fig. 2, and behind it is the flue for ventilating the vaults.

But the warm air will not enter the room unless a corresponding volume of air is withdrawn at the same time; and this exhaust should be from near the floor, and on the same side of the room on which the fresh air enters near the top of the room. For the purpose of exhausting the vitiated air of the schoolroom, the furnace flue is extended upward through the roof, and it should be contracted near the top. This flue is represented in Fig. 2 (the large flue), and it will be heated by both the smoke flue on one side of it (which may be of metal) and by the diaphragm or slanting partition at the bottom. This diaphragm will be heated by the hot air impinging against its under side.

The vitiated air from the schoolroom reaches this ventilating flue as follows: The partition between the schoolroom and the cloakroom is raised 2 inches or 3 inches from the floor; on each side of the flue and above the diaphragm there is an opening of 18 inches by 24 inches, through which the air is exhausted from the top of each cloakroom, and as the doors and windows of this room are always closed (as said above) in cold weather, the vitiated air is withdrawn from the school room into the cloakroom, where the clothing is thus warmed and ventilated.

In order to secure warmth and perfect ventilation, it will be perceived that the floor of the schoolroom and the cloakrooms must be perfectly tight, and the walls should be lined with brick, or otherwise made tight, at least three feet from the floor, and all the entry doors must shut very close. In other words, good construction is indispensable to comfort—both warmth and ventilation. It is for this reason that double windows are requisite in cold climates. All the warm air within which strikes the cold glass of a window is at once chilled, falls to the floor, and creates a draft. Moreover, the best lighted part of the room is close to the window, and the first row of seats may be placed near the windows, as shown in Fig. 1, if the window is double.

At night, and before the children arrive in the morning, the cold air duct and the ventilating flues (I) leading from the cloakrooms may be closed. In that case, the door (D) of the furnace being open, the air within the schoolroom will come into direct contact with the stove, rise through the transom, and thus rotate throughout the schoolroom and warm all parts of it; and children may one by one warm their feet at the stove. But when the room is filled with children, the door (D) would be closed, and the fresh air duct and the ventilating flues (I) must be open in order that the stove may constantly heat the fresh air and ventilate as well as warm the room.

In Summer the diaphragm above the furnace may be raised to a vertical position; if then the door (D) be closed, the warm air of the schoolroom may pass upward through the transom and the ventilating flue, while the fresh air is supplied through the entry doors and windows, at W W (for this purpose and not for light), and through the two windows that may be raised in the front. In mild weather or on damp days a fire in the enclosed stove will help to produce the upward draft without heating the room.

A pailful of dry earth must be thrown into each vault every day, and the contents of the vault must be removed every week. This can be done by sliding outward a water-tight trough made for the purpose and fitted into each vault. These troughs should then be replaced, and each door through which the trough is drawn should be securely locked.

The house should have a dry, clean, and warm cellar; but where this cannot be afforded the house should stand on a sufficient number of posts two or three feet high and boarded around to the ground. These posts, and especially the foundation of the chimney and of the vaults, must be absolutely secure from frost, and the floors might be boarded below the joists and plastered between; and there must be felt or thick layers of paper between the floors. A cold floor is costly and dangerous; and the cold schoolhouse costs more in the end, in health and in fuel, than it costs to build a tight, warm house at first.

As to the light. The best light for the pupil comes from the left, with no cross lights; but if the whole left side of the room is one continuous window, then the pupils in the back part of the room will face the light, though the window is at the left. To obviate this difficulty the first rows of desks might be placed with the axis at right angles to the window. After the first two rows, each desk is placed with its axis at a greater angle than the last, till the last row is at an angle of forty-five degrees. Such an arrangement is novel, but upon reflection there seems to be no necessity for the prevailing rectangular placement of school desks, with the teacher at the middle front. In this plan the teacher is at the left front of the pupils at T, and the oblique situation of the desks is shown. This position requires chairs and not shelves for seats—the only rational seat; and there is no excuse for any but adjustable seats and desks.

The best light is from the top of the window. A window properly lights the room only at a distance of one and a half times its height. The south light is the best. The north light is too cold in Winter and lacks the effect of the sun's rays in the room—chemical and hygienic effects not explained, but known to exist. The east and the west window admit the slanting rays in the morning or afternoon. In Summer, though the rays are hot, they are nearly vertical at noon and do not shine directly in at the windows of the south exposure. But there should be very light shades to roll from the top and temper the light when it is too bright, and dark shades to roll from the bottom to shut out the light sometimes—to shut it out from the bottom because, as said above, the light from the top of the window shines across the room. An awning of white cotton cloth on a rectangular frame outside the window would be inexpensive and worth many times the cost in a single Summer.

Any intelligent carpenter could build a house like the one described, and if some architect would build into it only a little good taste and chaste beauty, the house as well as the teacher would be an educator and a public benefactor.

THE DOCTOR AND THE SCHOOLS.*

The public school has more to fear from its friends than from its enemies. To condemn it as a nuisance which ought to be abated is to fight it openly and above board. We can meet our enemies in the field and defend our position. But it is a much more difficult task to ward off the attacks of those who criticise whatever does not square with their own notions or who, knowing only a part, proclaim the worthlessness of the whole.

Thus a physician of some prominence, said to me the other day, "Your schools are filling our insane asylums with patients." To which I might have replied, "You doctors, through your blunders, are sending half your patients to the graveyards, when if you had let them alone, they would have recovered." One story would have been as true as the other, and both of them equally false.

I cannot defend the schools against every charge, but in the name of thousands of conscientious teachers, who are striving faithfully to do their duty and who sincerely regret the tendency to crowd the brain at the expense of the heart and body, I do protest against the tendency to charge up to them and the school system all the evils to which childhood is heir. One physician would not have children go to school until they are seven or eight years of age. When asked, "What would you do with them in the cities and villages where parents are at work?" he replies, "I don't know." The fact is, he had never thought of that. Another one would have them in school but half the day, and when asked, "What of the rest of the time?" replied in the same strain, "I don't know." These men were honest, but neither of them grasped the entire situation.

"What is the full duty of the State to the child in a republican government?" has never yet been fully answered. It has not yet been fairly considered. It is very easy to find fault. Undoubtedly if Gabriel should blow his trumpet to-night, some one in this audience would exclaim, "This is the result of the public school system."

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*By Henry Sabin, Superintendent of Public Instruction. Read before Iowa Public Health Association, at Davenport, May 19, 1896.

We must not forget that the public school is here to stay. It cannot be supplanted by any system of church, parochial or private instruction. If all the Christian churches in Iowa should combine to educate each the children of its own communion, there would still be one-half the school population to be cared for by the State. I mention this only to illustrate the necessity of considering calmly and with great deliberation those questions which concern public education.

The question naturally arises, what does a schoolmaster know about medicine. Nothing whatever, except to let it alone. For that reason he is of all men most competent to talk about it. Talk about those things of which you are supposed to know but little, and the world will excuse your mistakes; but when you talk of those things in which you are supposed to be an expert, every mistake will be as a dagger thrust between the ribs of your reputation.

There is no science which has made as great advancement during the past fifty years as that of medicine. The old list of salts and senna, of jalap and aloes, of calomel, rhubarb, emetics, blisters, belladonna, morphine, leeches, and lancet, has given place to newer and more simple remedies. The skillful surgeon will take a living subject all to pieces, joint by joint; he will disembowel him, cleanse the cavities with some antiseptic preparation, and put each organ back into its proper position. He will split a man's skull in twain and wedge it apart permanently, in order that his brain may have a chance to expand and grow. The dentist will extract his teeth, fill them, and insert them again in their cavities; the oculist will take out his eyes, turn them inside out, and put them back in their sockets.

It is no longer necessary for a man to die in order to be dissected. The time is coming when the living subject will willingly place himself upon the dissecting table and allow the surgeons to take him to pieces, provided they will compensate him for his time and trouble.

It has been the duty of the doctor in the past to heal the sick, to relieve us of our aches and pains, to thwart that penance which nature thrusts upon us for the violation of her laws.

In the future the physician's art will consist largely in keeping men well, in warding off sickness, in preventing the spread of disease among the people. He will not study therapeutics less, but hygienics more. He will be considered th most successful physician who has the fewest patients. Me will pay for being well, and not as they do now, for being sick

The coming doctor will not alone seek for the remedy, bu will give himself no rest until he has searched out the cause That outbreak of diphtheria or typhoid fever in the neighborhood calls for something more than simply curing the disease Somewhere, in some well, which is the common resort of th people for water, in some connection, hitherto unsuspected between a vault and a hidden watercourse, perhaps in tha stagnant pool which for years has been the receptacle fo vaults and barnyards, and graveyards possibly, of that regio somewhere is there a hidden cause, and the physician will hav skill and intelligence enough to discern it. To-day a few case of scarlet fever or diphtheria in a neighborhood calls for closing the schools until the disease is stamped out, and then th school is reopened without that careful inspection and invest gation of the building and its surroundings which alone ca insure the children against a renewal of the disease. Is th common sense? Is it not criminal carelessness?

The coming physician will hold himself so strictly accoun able for the health of the community in which he resides, a especially of the families and their children under his charg that he will regard the outbreak and spread of any of the co tagious diseases which are now so dreaded, as a reflection up his professional skill. The children of the village school a pale, languid, and complain of headache. What is the usu diagnosis? Too much study, too close application. That, b the way, is not one of the diseases laid down in medical boo as incident to childhood. What is the remedy? Take the out of school and criticise the teacher for overworking t pupil. Before the doctor makes this diagnosis of the diseas he should be more sure of his ground than he usually is.

There is no more important question before us to-day th the ventilation of schoolrooms. Pure air under all conditio of life is an absolute necessity; but when thirty, forty, fifty, even sixty children are shut up in a schoolroom, many of the coming from homes where the bath tub is a luxury unthoug of, and often the garments are worn day and night, perha unwashed for weeks, only the most complete forced ventilati can keep the air decently pure. The problem is intensifi when we remember that to the impurities arising from the usual causes, we must add those from catarrhal breaths, diseased stomachs, decayed teeth, and uncleanly persons. The chalk dust from the blackboards must not be forgotten. It is a very liberal allowance to say that in the average school of forty pupils where there is no ventilation the air is unfit to sustain vigorous life at the end of the first five minutes. Yet in all this State there are comparatively few schoolrooms, in the building of which the supply of fresh air has been taken into account. This is as true in the city as it is in the country. The next time, my good physician, that you find the children in a family under your care are puny and white, order them taken out of school, and kept out of doors as much as possible, but give credit to the fresh air and the sunshine for their cure, rather than to your skill. In the meantime, if you understand your business and are searching for causes as well as results, visit the school which the children attend, if you think you can endure the sight of so many young immortals killing themselves by hard study. The first breath of fetid air will make you faint, but persist and go in. Here you will find a room twenty-eight feet by thirty-two by twelve, heated by a vicious soft coal stove, or an equally vicious hot air furnace, and absolutely with no means of ventilation, except by lowering the windows. This the teacher hesitates to do because a blast of cold air slays like a sword I say, no means of ventilation. Possibly you will find a hole in the ceiling, seven by nine inches in size, or one of the same dimensions in the side near the chimney, which for ventilating purposes is of no practical use whatever. In this room you will sometimes find seventy pupils—two, often three, at one desk. If you happen to find a thermometer it will register possibly from seventy-five to eighty degrees.

The cracks in the walls and in the floor are filled with the accumulated dirt of many terms, the best possible breeding place for disease germs, bacteria, or whatever name may be most appropriate. The floors have not been washed for weeks, months, perhaps years. The desks and seats have not tasted hot water since they were screwed into their places.

In Germany recently an examination of the scrapings from under the nails of thirteen school children revealed the germs of fifteen distinct diseases.

Pull up a board from the floor, so that the nostrils may have the full benefit of the fragrant effluvia and you will find as many distinct and several smells as Coleridge found in the city of Cologne, and that I think was seventy-two. You remember his immortal verse—

"The river Rhine as is well known
Doth wash the city of Cologne.
But, O, ye nymph, what power divine
Can ever wash the river Rhine?"

Possibly you will find that the school authorities have dispensed with the outdoor recess and that the teacher has substituted for it a five minutes' gymnastic drill, which as a matter of exercise is about as beneficial as a long, deep, healthy yawn would be. I do not know who first suggested the idea of abolishing the outdoor recess. Whoever he was, he was no friend to children. There is nothing that can take the place of it.

Do not hasten to leave the premises until you have finished your inspection. You will likely find a water-closet, vile and foul as hades. The vault has not been cleaned for ages. The building ought to be purified by fire. Sensitive children avoid visiting it and thus injure their health, and if they visit it they injure their morals. Don't charge it all up to overworking the brain. I quote from the last report of the superintendent of public instruction: "Yet there are to-day in some districts conditions which would disgrace the civilization of the Apache Indians. If the women of Iowa who are so earnestly and nobly working in the caase of temperance instruction and patriotism, who are just awakening to a greater interest in the public schools, or the personal purity associations, would make an investigation along the lines indicated, they would possibly find a field of labor of which they have before had no conception."

The superintendent of public instruction for Maine says: "The condition of these hovels is so shocking that I feel justified in calling special attention, in strong language, to the duties of the towns in this connection."

This condition is peculiar not alone to our country schools, but it prevails in some of our city schools, and I am informed even in some of our higher institutions of learning. The principal of a school in one of the larger cities of Iowa, said to me within a week, "The closets are under the building, in the basements, and at times it is almost unendurable."

You are in no haste, so let us return to the schoolroom. Do you see that little girl writing at her desk? Observe that her arm is elevated so as to be at right angles with her side, and that her left shoulder is correspondingly depressed. In a few months her mother will bring her to the physician to be treated for curvature of the spine. Do you think hard study did it? Wouldn't prevention be better than cure in such cases?

Now, notice that boy moving uneasily in his seat, swinging his legs as they dangle in the air. His feet are six or seven inches from the floor. How would you like to take his place and swing your feet for hours at a time? By and by his mother will take him to the doctor and tell him that Johnny complains that his bones ache and his feet are numb. That he is too tired and restless to sleep soundly as a child ought to sleep. The doctor prescribes a tonic and "take him out of school." An adjustable seat and desk would remedy both these evils and save the doctor's bill.

Go across the room and sit down beside that group of scholars. They are endeavoring to make out their lessons from the blackboard. You can get an indistinct outline of the writing and that is all. The pupils are squinting their eyes and twisting their heads and straining themselves to make out the writing, but the light strikes the glazed, shining board so as to give them the greatest possible amount of trouble. The time is near when those children must be taken to an oculist and have glasses fitted to their eyesight, which is permanently injured. The increasing shortsightedness is due very largely to the defective methods of admitting light, or to insufficient quantity in certain parts of the room.

Your time is up, but before you go it will take but a moment to convince yourself that some parts of the room have less light than is needed on cloudy days, and that there are no shutters or curtains to shield the eyes of pupils when the sun is bright; that some seats and desks are too high, and others too low; that blackboards are placed between the windows where the light is as bad as it can possibly be, and that the general arrangement of the room is in entire disregard of sanitary laws.

Ask one more question. Where do these children get water to drink? It is as important to have pure water at the schoolhouse as it is at the home. How far is it from the well to the vault? Fifty children, perhaps, must drink from two or three cups. Sometimes the water is passed about and all drink from one cup. Worse yet: if a child fails to drink all that is in the cup, it is passed to the next or thrown back into the pail. Bah! it makes one sick to think of it, and yet various diseases are conveyed in this way. And the doctor wonders where the child contracted the disease.

I am not here to say that teachers are not at fault. They are, in many cases, ignorant of the conditions which promote healthy growth in children. But I am here to say that not one physician in ten is fitted to criticise the plans of a schoolhouse as to heating, seating, lighting and ventilation. Not one physician in ten ever thinks of making a thorough inspection of schoolhouses, school premises and school customs in order to ascertain either the cause of an outbreak of scarlet fever or diphtheria, or the reason why the children of the families under his care are not growing toward a sound, symmetrical, healthy development of the body. Not one school board in a thousand would ever think of submitting plans for a new building to a physician for approval. And yet if this does not come within the proper scope of the physician's business, what are physicians for, anyway? This is all the more necessary, because architects have only just begun to study school sanitation. For instance, the risers, including the tread of the stairs, should not be over five inches. They are generally seven, often eight. The treads should be twelve inches in breadth. They are often only eight or nine, and the stairs must be crowded into a certain space, no matter how steep they must be constructed. Everything should be made to give place to the sanitation of the entire building. Three-story buildings are going out of fashion, but in many places the little children are in a half basement, the window sills of which are level with the ground outside. The physicians who are accountable for the health of such children ought to protest and make their protest heard both by parents and school boards. To put little children in such a room is an outrage on childhood.

Do not misunderstand me as overlooking the course of study. It is too top-heavy; it is overloaded. Intellectual and social growth is forced. But teachers are not at fault. Every man who has a hobby makes a bee-line to the door of the nearest schoolhouse to experiment upon the helpless children. God bless the teacher, man or woman, who will stand up and protest against it. The introduction of so many special teachers is not productive of health, because each one crowds and nags the children to make special exertions in his line. The nerves of the children give way under the pressure. There is too much home study, and there will be as long as every pupil must carry four and often five full branches, besides some extras. The fault is with the parents who will have it so. The piano is helping the school. Music has many charms for those who know and love its sweet mysteries, but to set a boy or girl who has no musical talent, to drumming two or three hours a day on a piano, would be ridiculous were it not sinful.

There are five points which I wish to touch upon in conclusion:

1. Our present duty is to establish in our schools right sanitary conditions, before we attempt to judge what evils are due to overpressure. There are seats which can be adjusted to the height of children. There are systems of ventilation and heating which are nearly perfect, but these all cost money, and unless there is a popular demand, school boards will invariably purchase the cheaper. Physical culture is not the present remedy.

2 Teachers are usually alive to these questions. They discuss them at their associations with interest and profit. The leading educators are better posted upon them than physicians are. I grant that they ought to be, but the needed reforms can be brought about only by the united efforts of the friends of public health everywhere. In this movement physicians should be in the foremost rank.

3. There is a demand for a professorship of sanitary science in our normal and medical institutions. The conditions which conduce to health in our school buildings should be included in the instruction given. The medical school and the normal school should join hands in this new crusade for humanity's sake.

4. The duty of the public schools is to train boys and girls so that they may become healthy, clear-headed, upright men and women, capable of producing and perpetuating a race of stalwart American citizens. To accomplish this, the doctor must reinforce the teacher. He should make himself acquainted with the conditions under which children study, so that he may intelligently advise parents and school authorities. The word of the intelligent physician should be law, and under his direction the pupil should be allowed to attend a half day, to drop some studies, or even to study at home and recite at school. But the physician should not place the school at a disadvantage. Under such conditions he should place a rigid restraint

upon evening parties, unwholesome diet, and insufficient sleep. All that the schools ask of the physicians is fair play.

5. I have discussed this question from the physical side because I think it is of the most immediate importance. I am aware that there are other lines along which we ought to push investigations and discussions. But we must first establish more favorable conditions before we can decide other matters which depend largely upon the sanitation of the school. Every schoolroom, whether public, private or parochial, ought to be carefully inspected and approved by competent authority before it can be used for school purposes. The State does not lose its interest in the child because his parents elect to have him educated in some other than a State school. Fewer children would be injured by hard study were the home life what it should be. Here the doctor again should interfere and forbid the dissipation and the exciting life to which children are subjected out of school. The brain, the seat of being, wonderful in its mechanism, mysterious in its work, is seldom injured when Nature stands as warder at its gates.

THE CESSPOOL ABOMINATION.

The numerous requests from various localities throughout the State during the biennial period for aid from the State Board to rid some suffering community from the nastiness, filth, corruption, and menace to public health of cesspools, evidence that they are still tolerated in some communities.

Strange it is, and well-nigh incomprehensible, that such should exist where there is a claim to civilization.

The foundation of sanitary science lies in three conditions:

1. Pure air.
2. Pure earth.
3. Pure water.

Destructive of them all is the pestiferous cesspool.

Throughout the State are groups of houses, large sections of towns, aye, even whole towns, where is general slovenliness in everything respecting the removal and disposal of refuse matter—a slovenliness which is menaceful and unaccountable: where, contiguous to houses, or common to many houses, is permitted to lie undisturbed, except perchance by rooting hogs, the rotting refuse of house life and trades: excrement of man and brute; sometimes stored out of sight in drains and sewers which cannot carry them off; sometimes held in specially-provided pits and cesspools to favor accumulated rottenness.

In many a village garden may be seen cesspool and well side by side, environed with hog-pens, privies, and heaped accumulations of the horse and cow stables. Poison steals through the porous soil. The pestilence which walketh in darkness, comes at last, and panic reigns throughout the community. An inquest is held upon the epidemic. The old, old story is repeated — diphtheria, or typhoid fever from well poisoning. The well is closed, the water supply is cut off, but the cesspool continues, the process of infiltration, pollution, pestilence and panic goes on. The silent, unerring processes of nature are immutable. Trench upon the cause of it all, and there is vigorous protest that it is interference with modern ideas of civilization — the right to do as one pleases with his own. It has not entered the mind that the scavenger is less expensive than the doctor and undertaker — that prevention is cheap and certain; cure expensive and uncertain.

To the superficial observer on the surface these pollutions and pestilences may appear to be evils, but to the practical man who views them from the bottom of a well, they become public disasters and witnesses of culpable wrong-doing.

A cesspool is an abomination which should not be permitted to exist. One that does not at least pollute the air, is impossible of construction. One that is absolutely water-tight, periodically cleaned, and least objectionable, is expensive, hence seldom adopted.

It is however, the shallow pit, consisting of a hole in the earth, too often seen all over the State, against which this vigorous protest is made. Sometimes it is walled with loose plank, stone, or brick, the object being to allow the liquid matter to escape, under the popular, yet erroneous impression that the earth is an adequate purifier and disinfectant.

The presence of air and water in the earth is necessary for complete disinfection. The antiseptic properties of the earth about a cesspool are confined near the surface, while there is being poured into the soil a constant stream of pollution which spreads wider and wider with every rise and fall of the ground water. In fact so saturated may become the soil that it is not a matter of filtration but of dilution.

Universally over this State shallow wells furnish the water supply in town and country. The contamination and pollution from these cesspools, including open privy vaults, is a matter of general observaton. How far this pollution will traverse the soil and infect a well, has not been definitely determined, nor can it be. It depends upon the nature of the soil. Water will percolate all soil in all directions, but some more rapidly than others, and more freely with than against the dip of the strata, and the topography of the surface is no indication of the dip. One may have his well upon a hillside and the cesspit below, and assume that sewage will not run up hill. The fallacy of this is shown in Fig. 1. The supply of water in a well is dependent on the extent and permanence of the ground-water supply of the region. In the illustration the ground-water does not form a collection but flows slowly along the rock surface, and though the well-curb is at a higher level than the cesspit, it does not follow that the water is pure.

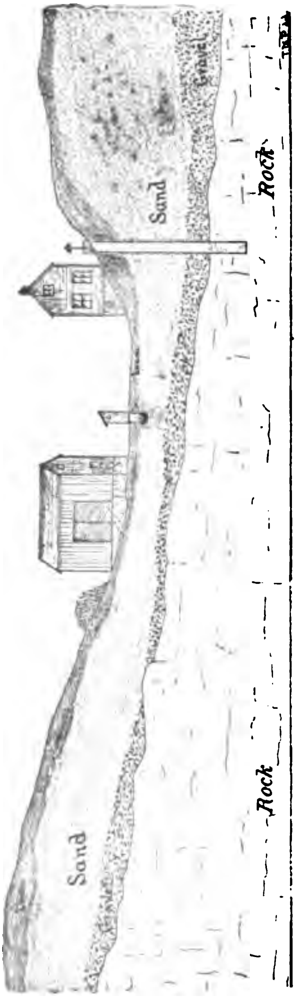


FIG. 1. A contaminated well with intermittent supply from the ground water.

It is estimated that by the drawing of two feet of water from a well, the horizontal suction radius extends from one hundred to two hundred feet, and it should be born in mind that this suction facilitates the spread of the pollution from a cesspit. Therefore, let a person take his well in any of the cities and towns in this State, as the center, and with a tapeline measure two hundred feet, as the circumference of a circle. Then count the privy vaults, cesspools, hog-pens, and barnyards within the circle, and he will have a very good idea of the reservoirs he draws from with every stroke of the handle of the pump or lift of his bucket.

One of the most notable instances of pollution of a water supply by long distance percolation is that known to all sanitarians as the Lausen case in Switzerland, exhaustively investigated by Dr. Hagler, of Basel. On the side of a mountain ridge was an isolated farm house. A brook ran past this house and was utilized entirely for the irrigation of meadows. The effluent water filtered through the mountain intervening to a spring at a lower level, the water from which was used by all the families in the village of Lausen except six. Suddenly an epidemic of typhoid fever broke out in the village. More than one hundred and thirty persons were attacked, but none in those families who used no water from the public spring. It was found on investigation that at the farm house on the mountain side a man had been sick with typhoid fever, and this brook had received the dejecta from the patient. To prove that this was the source of the sickness eighteen hundred pounds of salt was dissolved in the water distributed over the meadows, which soon after manifested itself in the water in the spring. Then several hundred pounds of flour were thoroughly mixed with the water, but not a trace of it made its way to the spring, thus conclusively proving that the water filtered through the earth nearly a mile and did not pass in an underground channel.

Mr. Childs, health officer for a certain district in Oxfordshire, England, reports a striking instance of contaminating wells from a source above their level. He says:

> In consequence of the escape of the contents of a barrel of kerosene, which had been buried in an orchard, a circuit of wells two hundred and fifty and three hundred yards distant became so affected the occupiers of fifteen houses, containing eighty-two inhabitants, were for ten days unable to use the water for drinking or cooking. Cattle refused to drink at the spring where they were accustomed to drink. Had this soakage been sewage instead of kerosene who can doubt the result might have been wholesale water-poisoning and an outbreak of typhoid fever.

In Kalamazoo county, Michigan, a site was selected for a cemetery. A neighboring lot owner objected on the ground that soakage from it would contaminate his well, thirty rods distant. To test the matter a chemist deposited lithium in the soil at the proposed cemetery site. Eighteen days after lithium was found in the water of the well, thus proving beyond question that the well would have been polluted by the poisons from decaying bodies in the cemetery.

In the city of Adrian, Mich., was a school, on the grounds of which was a well. There was also a basin into which was thrown the slops, and which connected with a long drain. A pupil was sick with typhoid fever; some of the slops from this patient was thrown into the basin. Soon after fifty pupils were attacked with typhoid fever, and the cause was traced to typhoid germs in the water in the well, which had percolated through the soil from this drain pipe.

There is another form of cesspool, of which hundreds may be found in this State. It is the well cesspit. A person builds a new house, puts in the necessary fixtures and connects them with the public water supply. To save the expense of sewer connection he debouches the sewerage and waste from the house into the abandoned well, thus menacing other wells in every direction for a long distance. Such an act is really criminal. It may be done ignorantly, but it is none the less a crime.

As a measure for the prevention of the danger to the public health it is suggested that the following provisions be enacted in every incorporated city and town in this State. It would be better if they were made a part of the State statute:

1. That no refuse matter, sewage, waste, or other noxious or polluting thing shall be knowingly permitted to pass from any dwelling house, stable, or other building, or any farm, stock-yard, factory, distillery, creamery, slaughter house, or other premises, through any open drain or covered channel, into any stream, ditch, or natural water-course, or any basin, reservoir, or stagnant pool, unless such refuse, sewerage water, waste or other matters shall have been previously cleansed from all noxious and polluting ingredients.

2. That in all cities and towns where no special system of drainage exists, there shall be provided receptacles for temporary deposit of fœcal matters, waste, and rubbish, the contents of which shall be removed at stated times, and deodorized by layers of common soil. That the same shall at all times be kept so that it shall not be a nuisance or injurious to the public health.

3. That no cesspool, for the collection under ground of any drainage, filth, or other noxious matter shall be constructed, or permitted upon any ground, or premises, unless the same shall have been rendered water-tight, by means of cement or asphalt, or be distant not less than two hundred feet from any public or private well, spring, pump, or fountain which is used

for drinking purposes, and that no well shall be dug or constructed within the same distance from any already existing cesspool, whether upon the premises of the owner of such cesspool or otherwise.

4. That no water closet shall be used or constructed in any dwelling or building until proper provision has been made for receiving and discharging the contents of the same so as not to be a nuisance, or dangerous to public health by the pollution of any wells, or water-courses, or otherwise.

SANITATION.

The word "sanitation" is comparatively new—especially to readers of official documents, and is to most of persons suggestive of measures that are undesirable if not repulsive.

It suggests hygienic laws that interdict many proposed pleasures. It hints at restraints, quarantine, isolation, preventive measures, health laws, health boards and many personal inconveniences. It suggests personal uncleanness, and soap and water as remedies. It suggests that many enterprises are conducted as nuisances, and demands their abatement. It suggests that the water, milk, food, and fruits that we use are liable to contamination, and thus likely to prove a curse instead of a blessing. It suggests that if we have small-pox, scarlet fever, or any infectious disease, we are, or some one else is, at fault. It suggests that most of the ailments that we have, instead of being mysterious dispensations of Providence, are palpable dispensations of improvidence.

Sanitation, like hygiea, may be impersonated as a ministering angel pointing out the roads to sickness; guiding her willing followers into and along the highways of health, and saying to pestilence and pain when menacing her faithful devotees, "Thus far and no further."

Few fully appreciate the value of health and the many are thus unable to properly estimate the kind services of sanitation. Steine says beautifully and forcefully: "Oh, thou blessed health! Thou art above all gold and treasure; 'tis thou who enlargest the soul and openest all its powers to receive instruction and relish virtue. He that hath thee hath little more to wish for, and he that is so wretched as to want thee, wants everything with thee."

Sanitation, like "preventive medicine," is a broad term, and embraces all the measures recommended, or resorted to, to ascertain the causes of diseases; to determine the conditions most favorable to the incidence and spread of disease; to demonstrate and announce the means best adapted to prevent it, or, having appeared to stamp it out most promptly and efficiently.

Sanitation is then one of God's best gifts to man, one of the best friends of humanity; and it is well to enquire briefly as to what it has done and may yet do for mankind.

It has greatly improved the physical condition of the human family when its teachings are heeded and practiced. It has greatly increased the longevity of mankind and brought to its subjects a more comfortable old age. It has restricted the spread of infectious diseases so as to almost prevent epidemics. It has pointed out to plagues and malignant diseases their "metes and bounds." It has rendered small-pox, that used to be well-nigh universal, almost unknown and unheard of wherever vaccination and re-vaccination are properly resorted to.

There are thousands of physicians living to-day, who have been in practice for some years, who fortunately have never seen a case of small-pox.

It has nearly stamped out scarlet fever, that terrible dread of father and mother, until in many places of England, as well as of this country, years pass without a case occurring.

By isolation, quarantine and disinfection, diphtheria, whooping cough and measles, all bringing distress, disability, danger and death into so many homes, will soon, like small-pox and scarlet fever, be spoken of as reminiscences rather than experiences.

The most reliable and efficient sanitary measures against infectious diseases are few, and practically within the reach of all. They constitute a quintette which, if faithfully observed and practiced, would at once greatly reduce the number of cases of such affections, as well as render them much milder in type. The measures recommended are *cleanliness*, *vaccination*, *isolation*, *quarantine* and *disinfection*.

While *cleanliness*, implying clean bodies, clean water, clean air and clean food, is highly important, its importance and its varied applications are so well known and so generally admitted as to need no further notice here, further than to earnestly commend its faithful and practical observance.

When an infectious disease appears in a family it is highly important for the community generally, as well as for the family so afflicted, that the patient be *isolated*—be either put into a room by himself or herself, as far removed as possible from the other members of the family, or else removed to a hospital; or else all others in the family who are susceptible to the disease should be removed. The removal of children or adults from a place where an infectious disease has broken out, into another family, is always fraught with more or less danger, because it is impossible to know whether the brief exposure, before removal from the home, even if disinfection has taken, was not sufficient to develop the disease. The great object of isolation and all restrictive measures is to prevent a second case if possible, and by prompt and thorough isolation this may generally be done, even where there are several children in the family.

With isolation, *quarantine* of the whole premises should at once be established, rigidly maintained, and only released by the proper health authority upon assurance of the complete recovery of the last case, the lapse of at least fifteen to seventeen days additional after such recovery, and thorough disinfection of the person and belongings of the inmates and of the premises.

This word "quarantine" is a terrible bug-bear to most persons. It should not be. It is a misfortune to have the sickness —a misfortune resulting generally from the wanton carelessness of some one else, or of the family afflicted, by improper exposure. The quarantine card is not a disgrace. It is but a signal of danger—a warning to others—especially to those having children, that there is danger to be avoided. The quarantine affords the mother a rest, generally a much-needed rest, from the exacting weariness of the customary social functions. It shuts her up with her children and gives the parents and children a splendid and too-often-needed opportunity to get acquainted with each other; and it also affords an object lesson in sanitation and preventive medicine that has a most salutary effect, not only upon the members of the family, but upon the community as well.

The last measure suggested is *disinfection;* and it is also a highly important, if not the most important, measure of protection. Many imagine that disinfection means the removal of some foul odor—deodorization. It means the destruction, as completely as possible, of the germs of disease—the use of a germicide. Comparatively few of the so-called "disinfectants" so persistently advertised for commercial purposes are in any way reliable. The number of reliable disinfectants are very few. They are sunlight, heat, carbolic acid, bichloride of mercury, sulphur, quick-lime and formaldehyde. The last named has rapidly grown into public as well as scientific favor. Elsewhere in this report will be found an extended consideration of it. The means of application of these agents are simple, and should be known and promptly explained by any competent physician, or by the health officer of any local board of health.

Don't forget that cleanliness, vaccination, isolation, quarantine and disinfection, if faithfully observed, will save the people of the state millions of dollars annually.

THE IOWA HEALTH BULLETIN.

No one agency employed by the health department of th State has been more productive of good than the publicatio of THE IOWA HEALTH BULLETIN.

Issued as it is monthly it carries into thousands of home information respecting sanitary matters that is fresh and fro the best possible sources.

Copies are sent to all the district judges, to all county attorneys, to county clerks, to county superintendents of publi schools, to all city and township clerks, to health officers, t mayors, to local health boards, to the superintendents of district schools, to the colleges and public institutions of th State, to libraries and to a great many physicians and layme who ask for it. It is also sent in exchange to state boards, t sanitary associations and to sanitary publications, as well as t our representatives in Congress and to the members of ou Legislature, requiring an edition of six thousand copies. It i the official organ of the Board, and in addition to the proceedings of the Board at its quarterly meetings it furnishes shor practical articles upon hygiene and sanitation that are not onl educational but are stimulative and encouraging by showing what has been done, what is now doing and what can be done by well directed effort in the way of preventing and stamping out entirely many of the infectious diseases that have no right to exist in any civilized community.

Though the publication of the BULLETIN entails a great deal of additional work upon the Secretary the expense is comparatively light and is entirely within the appropriation.

FORMALDEHYDE.

Every community and especially boards of health are interested in any and all measures tending to decrease the danger from contagious and infectious disease.

One of the most important of them is that of disinfection whereby the germs of disease are destroyed. Hitherto dependence has been had largely upon heat, and vapors generated from various substances, principally sulphur. The latter has been used principally owing to its accessibility and convenience, but results have been unsatisfactory.

1. Because it is unreliable as a germicide.
2. It injures fabrics and wall paper.
3. It is peculiarly obnoxious to respiration, rendering rooms in which it is used, unfit for use for considerable time.

Sanitarians and hygienists were therefore ready and pleased to receive the announcement of the discovery by Trillat, in 1890, of a process for evolving a gas (Formaldehyde CH_2O) from methylalcohol, which will destroy disease germs without damage to rooms, injuring fabrics, destroying colors, or tarnishing metals, except iron and steel. Possessing the highest germicidal properties, it has rapidly advanced to the front rank as an antiseptic, and become the ideal disinfectant. Its vapor almost instantly penetrates every crevice of a room, floors, bed clothing, wardrobes, closets, rendering innocuous all infectious materials. The accidental inhalation of its vapor, or even drinking the solution will not result injuriously. All of which commends it for use in every day life. Exhaustive experiments in every direction have been made, and the universal decision is that formaldehyde is the disinfectant *par excellence*.

IN SCHOOLS.

Schoolrooms may be daily disinfected during the periods of epidemics, and thus enable the schools to be kept open. The generation of formaldehyde vapor in the rooms will cause complete disinfection of all of the contents of the rooms, such as desks, books, wall maps, and blackboards. The cloakrooms containing cloaks, hats, coats, rubbers, comforters, etc., of the pupils may be filled with formaldehyde vapor and thus disinfected while the pupils are at their lessons, rendering transmission of disease by this means improbable. Even the water closets may be rendered inodorous and free from contagion by this method.

IN THE HOME.

In the home the use of formaldhyde is accompanied by the highest advantages. The sick room may be disinfected by means of the generator, every piece of furniture being acted upon by the gas set free in the room. The nurse and relatives of the patient are thus greatly protected, and when convalescence from diphtheria, scarlatina or other contagious or infectious diseases sets in, the occasional visitor will run very little chance of carrying away any contagion. It is also of the highest advantage in the disinfection of rooms with their contained furniture when visitors, who may be suspected of having been exposed to contagious disease, have departed. Many persons innocent of knowledge or intent of conveying disease have carried contagion to families where they have visited. The instant sympathy which is shown to a stricken family causes well meaning friends, neighbors or relatives to visit the family and patient to offer services before the nature of the illness is known and wide distribution of contagious disease results. The innumerable epidemics of the world's history furnish abundant examples of diseases spread by this means. The convalescing patient is also a source of contagion in most cases, as the bacteria of infectious and contagious disease linger with or near the recovering patient, ready for a new subject. In fatal cases the contagion may be conveyed to the funeral attendants and visitors and multiply the disease and death. The ease or readiness with which every article that is used in the sick room, such as tableware, medical necessities, bed pans, etc., etc., may be disinfected without injury by formaldehyde gas, makes it the ideal disinfectant for home use. Not less notable is the fact that it will not injure or change the most delicate tints of wall paper, drapery, painting, fresco work, nor blacken or tarnish metallic instruments or silverware.

IN PUBLIC OFFICES, HOTELS, ETC.

Equally important to the people is it that the sanitary condition of the home shall be extended to public offices, hotels and business houses.

Jails, prisons, station-houses and work-houses require frequent disinfection to preserve the health of inmates. Formaldehyde vapor is here the best antiseptic, inasmuch as it is a deodorant as well as a disinfectant, and sweetens the atmosphere while destroying the bacteria. If the atmosphere be impregnated with formaldehyde gas it will penetrate every crevice of floor, wall, ceiling or closet and destroy lurking disease germs. Its economy also fits it for a wholesale use in such places.

IN LIBRARIES, PUBLIC AND CIRCULATING.

Formaldehyde is the only practical disinfectant for books. Books of circulating libraries acquire all the disease bacteria that are present in the homes of the borrowers, since it is usual for patients to be provided with books from circulating libraries in order to pass away the hours of convalescençe, time when disease breeding bacteria are still present. Perhaps the nurses or attendants of the sick are not less guilty of borrowing books while surrounded by the infectious or contagious atmosphere of the sick room. Many epidemics have been shown to have been promoted in this manner.

Mr. E. G. Horton, working in the Laboratory of Hygiene of the University of Pennsylvania, has written an interesting and instructive article on the disinfection of books by formaldehyde obtained by the evaporation of a concentrated solution. In the work several questions presented themselves which were essentially as follows: Under ordinary conditions can books be disinfected by formaldehyde? What is the smallest proportion of the vapor to the air which will effectively sterilize in a limited time—as twenty-four hours? What is the shortest exposure that will suffice? Is a decrease in the amount of the vapor present counter-balanced by an increase in the length of time of expose?

The main conclusions reached were to the effect that books could be disinfected in a closed space by formaldehyde. The

disinfection is rapid, when the atmosphere is rich in formald
hyde, the effect produced in the first fifteen minutes is practi
ally equivalent to that observed after twenty-four hour
Prolongation in the time of exposure does not counter-balan
a dilution of the formaldehyde. In cases where the disinfe
tion had been incomplete, the vitality of the organisms ha
been so weakened that they survived, only if transferred in
few hours to media suitable for their development. The use
formaldehyde is not detrimental so far as observed in an
manner to the books, nor is it objectionable to the operat
beyond temporary irritation of the nose and eyes, somewh
similar to that produced by ammonia.

The frequency with which second and third cases of scarl
fever appear in houses that have been disinfected by t
inspectors of sanitary authorities, says *The Lancet*, causes gra
doubts as to the efficiency of the procedure usually adopte
despite its official sanction. Stripping the walls, lime washi
walls and ceilings, and scrubbing woodwork and floor boar
with soap and water are indeed effectual enough, and to the
when thoroughly done we are disposed to ascribe any succes
ful results rather than to the more technical process of so-call
disinfection by sulphur fumes, which is little better than
superstitious rite or incantation shorn of the religious charact
it had in the mind of Ulysses when he "fumigated" the ha
desecrated by the massacre of his wife's suitors after removi
the corpses and washing away the blood with a promptne
that precluded all thought of other than moral pollution. B
in the light of bacteriological experiments dry sulphurous ac
fumes, whether generated by burning sulphur or carbonic su
phide, or, as has of late become the fashion, by opening cyl
ders of the compressed gas, are for all practical purpos
useless. The gas would act as a fairly powerful germicide
articles or fabrics previously saturated with water, but
bleaching action precludes its employment in this way wi
colored materials, carpets or curtains, and it is as what is call
an "aërial disinfectant" that it holds its ground in popul
esteem. But ærial disinfection is an absurdity; no one wa
to purify the foul air, which is easily enough removed by sim
ventilation. In disinfecting a room the true aim is to kill t
germs contained in dust on ledges or in the crevices betwe
the boards, or adhering to the walls and other surfaces, and t
dry sulphurous gas is powerless for this work.

Sulphurous acid fumes as a disinfectant have undoubtedly proved a failure, but we can reach and sterilize concealed infectious matter in rooms only by means of a reliable gaseous germicide. This we have in formaldehyde, as the following reports will testify:

In *Hospital*, July 25th, Dr. H. W. Jones gives an account of some of the latest work done with formaldehyde as a disinfectant of rooms and hospital wards. The experiments of Drs. Roux and Trillat have shown that the dust on walls could be completely sterilized. As regards penetrating power, the results are no less conclusive. Thus Dr. Bosc of Montpelier found that staphylococci concealed in the pocket of a coat, and colon baccilli placed under a mattress folded on itself, were rendered absolutely sterile.

Roux and Trillat have discovered an ingenious method of testing this penetrating power. This action of formaldehyde on gelatin is to render it insoluble; to make use of this property as a test little cubes of glass are coated with liquefied gelatin. When the gelatin has set these are placed in various positions in the room which is being sterilized, and after the process is completed examined by immersion in boiling water. It is found that on those cubes which have been exposed to the action of formaldehyde the gelatin coating is insoluble.

Another test, used by the same observers, depends on the power which formaldehyde possesses of converting aniline reds into blues or violets. Bits of cloth dyed with fuchsin can be used in this way as tests, or a combination of this and the gelatin test can be used, the gelatin being dyed with fuchsin before the glass cubes are coated.

Roux and Trillat demonstrated that animals can live in an atmosphere that has been treated by formaldehyde vapor. This is done by washing first with a solution of ammonia and then with sulphuric acid. This treatment would have no chemic action on any oxides of carbon that might have been formed during the disinfecting process, so that it may be taken as proved that the process is unattended by any risk for the evolution of carbonic acid. There is yet another point which has been brought out by these experiments with formaldehyde. It has been proven by Pottevin and also by Roux and Trillat that *to obtain the best results a temperature of thirty-five degrees C. is necessary.* Still, it was found by actual experiments in rooms that it is possible to completely sterilize walls, ceilings, floors, dust, air, and all contents at the ordinary temperature. There can be little doubt that from the point of view of preventive medicine this is one of the most important discoveries that has been made for many years.

Dr. J. Wortman, an eminent German bacteriologist, after a long series of carefully conducted experiments, reports as follows:

"It is evident, without further proof, that in formaldehyde we possess a substance that has a very deleterious effect upon vegetable life, and is therefore an antiseptic of first rank, which, almost equaling corrosive sublimate in its action, ought to supersede not only that but also carbolic acid."

He further recommends its liberal use in epidemic periods in the disinfection of closets, etc. Dr. Wortman's results are more than confirmed by the subsequent experiments of Dr. J. Stahl, whose work has the corroboration of Professor Cohn of Breslau.

Perhaps the most extended and thorough work with formaldehyde in this country has been done by Dr. J. J. Kinyuon of the United States Marine Hospital Service. We quote from his report as published in the public health reports of January, 1897:

"Bouillon cultures of the following organisms were spread on cover slips and allowed to dry, then exposed under a bell jar to a saturated atmosphere of formaldehyde, periods varying from one to sixty minutes. The slips were then planted into bouillon and kept at a temperature of thirty-seven degrees C. for twenty-four and forty-eight hours. In all instances mentioned "controls" demonstrated the vitality of the germs prior to exposure to the gas.

	ORGANISM.	TIME OF EXPOSURE.	AFTER 48 HOURS.
1.	Staph. pyogenes	All of 1 min. and over.	No growth.
2.	Spirillum Finkler	" 1 " "	" "
3.	Spirillum Cholera	" 2 " "	" "
4.	B. Coli. Com	" 5 " "	" "
5.	B. Typhoid	" 10 " "	" "
6.	B. Diphth	" 3 " "	" "
7.	B. Glanders	" 2 " "	" "
8.	Dip. Pneum. (partially dry)	" 2 " "	" "
9.	Dip. Pneum (dried)	" 1 " "	" "
10.	B Pyocyan	" 2 " "	" "
11.	B. Anthrac. (with spores)	" 2 " "	" "
12	B. of Bubonic Plague	" 1 " "	" "

Experiments in the disinfection of a room conducted in a ward of the new smallpox hospital of the District of Columbia by Dr. Kinyuon resulted as follows:

Room capacity, thirty-three hundred cubic feet; percentage of formaldehyde one; time twenty-two hours.

(*a.*) Cultures on Petri dishes, covered with filter paper, and enveloped in ten layers of blanket; anthrax, growth; diphtheria, no growth, S. pyogenes aureus, growth.

(*b.*) Cultures, spread on cover slips, placed in double envelope, the inner one sealed with paraffin, and enveloped in ten layers of blanket; anthrax, no growth; S. pyogenes aureus, growth.

(*c.*) Culture on Petri dishes, covered with filter paper, and wrapped in thirty-six layers of new cotton sheeting; anthrax, growth; diphtheria, no growth.

(*d.*) Cultures spread on cover slips, placed in double envelopes, the inner one sealed with paraffin, and enveloped in thirty-six layers of new cotton sheeting; anthrax, lost; diphtheria, no growth; S. pyogenes aureus, growth.

(*e.*) Cultures in double envelopes, the inner one sealed with paraffin and wrapped in folds of three sheets gathered into a bag; anthrax, no growth; typhoid, no growth; diphtheria, no growth; S. pyogenes aureus, no growth.

(*f.*) Cultures in Petri dishes, covered with filter paper and exposed on mantel in room; anthrax, no growth; diphtheria, no growth; typhoid, no growth.

(*g.*) Cultures spread on cover slips placed in double envelopes, the inner one sealed with paraffin, and exposed on mantel in room; anthrax, no growth; diphtheria, no growth; typhoid, no growth; S. pyogenes aureus, no growth.

(*h.*) Cultures spread on cover slips and placed in double envelopes, the inner one sealed with paraffin and exposed between the leaves of a closed book; anthrax, growth; diphtheria, no growth; S. pyogenes aureus, growth.

He characterizes the gas as a reliable disinfectant for curtains, clothing, carpets, bed clothing and surfaces generally. Complete success was achieved in many instances in sterilizing cultures of anthrax, diphtheria and typhoid when enveloped in ten layers of blankets or thirty-six layers of cotton sheeting.

The interiors of books were disinfected with some difficulty, as were the interiors of upholstered furniture, mattresses and pillows, though, as noted in his previous experiments, a comparatively small percentage of gas was employed.

He concludes that owing to the very volatile nature of formaldehyde, perfect and speedy disinfection can be secured only by stopping closely every possible means of escape to the outer air.

"Statements have been made," says Dr. Kinyuon, "that for room disinfection all that is required is to saturate clothes with formalin and hang them up in the room; allow the room to be closed for a given time, when it will be found to be disinfected.

"Our results do not confirm this.

"At this juncture it might be well to remark upon the effects of the formaldehyde gas and its solutions upon textile fabrics hair, fur and leather. Experiments were made by subjecting samples of wool, cotton, fur, and leather goods of every description to crucial tests, using solutions of various strengths and a saturated atmosphere of the gas.

"The results obtained were in every way satisfactory. O over two hundred and twenty-five different samples of wool silk, cotton, linen, leather, and hair subjected, there was n change observed in textile character, even when they were soaked in a strong solution of the gas.

"*Effect on colors.*—Little if any change occurred in the color of the fabrics; only three of the number showed any change These were two shades of violet and one a light red. Thes were coal-tar colors, and were also quickly bleached by th sun.

"*Effect on metals.*—Iron and steel are attacked by the gas and more so by its solutions. Copper, brass, nickel, zinc, an gilt work are not acted upon. The effect of the substance o iron should be borne in mind if iron disinfecting chambers ar used for applying the gas. If this be the case, the surface c the interior of the chamber should be protected by paint c varnish.

"After subjecting textile fabrics to the action of the gas, ther always remains a considerable quantity of the formaldehyde i combination with the materials, which is slowly given off fo a considerable time thereafter. This is especially so in th case of mattresses and feather pillows.

"This is best obviated by subsequently exposing the artic to the fumes of ammonia, which neutralizes the formaldehyd by converting it into a formamide—a rather stable body, po sessing germicidal properties of no small value, and not pro to undergo decomposition."

PROFESSOR ROBINSON, ON FORMALDEHYDE.

At the meeting of the American Public Health Association, held at Buffalo, N. Y., October, 1896, Prof. F. C. Robinson, Professor of Chemistry at Bowdoin College, Brunswick, Me., presented an exhaustive paper giving the result of his experimentation with formaldehyde, with a lamp devised by himself, in which he cited among many others, an instance where a test upon a large scale was made, to-wit:

"We were asked to disinfect a house in Portland, Me., where there had been three cases of diphtheria, one fatal. The house was a large brick residence very well furnished, and most of the furniture in place. The different patients had been ill in different parts of the house, so that the whole place must have been more or less infected. The whole house, including the three floors and basement, was of about sixty-eight thousand cubic feet capacity. Two halls and stairs connected the three upper floors making two direct passages from top to bottom. The temperature was kept at about seventy degrees F. throughout the work. All the fireplaces were stopped with burlap or paper, but no other precautions were taken. Three generators were used, one of one quart, and two of two quarts capacity.

All three were placed in the basement, and that and the laundry first flooded with the gas. The generators were left near the doors. After the alcohol had evaporated, they were quickly removed and the doors were kept closed for at least four hours.

The rooms were all taken separately in this way throughout the house, one floor at a time, beginning with the basement. The generators were then placed in the halls, all the room doors being closed. The mattresses were left for the most part upon the beds. The closets and bureau drawers were opened, and the bric a-brac, books, and other things left as they were with a good chance for the gas to circulate about them. It took about twelve hours to go over the whole house and nine gallons of alcohol were used or about one quart to every two thousand cubic feet of space. Threads infected with dyphtheria cultures were placed around in different parts of the worst rooms between sterilized blotters. Of the twelve cultures made from these, every one was sterile after incubation.

There can be no doubt that formaldehyde gas possesses the greatest of disinfecting properties. It has great possibilities of becoming a popular disinfecting agent. It has advantages above anything now in use for that purpose. It is comparatively cheap and with the new generator can be easily used by anyone of ordinary intelligence. It is not injurious to anything found in the most luxuriously furnished apartments. It leaves no disagreeable odors. If the windows are thrown open, in a short time no trace of the gas remains. In our experiments, all pathogenic germs were destroyed in three hours. But where the room is not needed for immediate use it would be well to leave it closed for twenty-four hours to make doubly certain under all conditions. The best and surest results are obtained with the rooms at ordinary living temperatures. Dampness is a disadvantage, as it absorbs more or less of the gas and holds the odor in the rooms. It can have no injurious effects upon persons occupying the house after disinfection, and the only inconvenience to those using the gas is a little smarting of the mucous membranes of the eyes and nose which can be avoided by the use of a damp towel. Bedding should be hung upon lines or chairs and everything exposed as freely as possible to the action of the gas. At least one litre of alcohol should be used for every two thousand cubic feet of space, which would be about a quart for a room 15x13x10. With a little care and common sense, good results can be obtained.

At a meeting of the Maine Medical Association, June 3, 1897, Professor Robinson read a paper on "Disinfection," in which he reaffirmed his former opinion of formaldehyde as follows:

I shall limit my subject to what may be called space disinfection, or, as it commonly presents itself, the disinfection of rooms or houses. This is and has always been the most difficult kind of disinfection, and of course the most important. When the infectious material is in a vessel of small size it is a comparatively easy matter to destroy it. There are several cheap and effective substances which can be used with confidence. It is true that a better one than any of these would be hailed by sanitarians, but they are not suffering for it as long as they can get bichloride of mercury or bleaching powder. All health boards have formulas for making and using these. But in the case of rooms it is a different matter. The poisonous matter may be anywhere. It is not a question of a few drops of a disinfectant put here or there, but some put everywhere.

One is confronted also with the matter of destruction of materials in a room. A room may as well be stripped to its laths and replastered at once as to be treated with bichloride of mercury or bleaching powder in sufficient amount to properly disinfect it.

It was formerly thought that a strong smell of carbolic acid or camphor in such a room would be sufficient, but we now know that it is not. Recourse was then had to sulphur, and for the past ten years nothing satisfactory had been proposed as a substitute, until about a year ago we began to hear of a material called formaldehyde.

Sulphur, as you all know, is burned for such purpose, and the disinfecting material formed is sulphurous acid. The drawbacks to the use of sulphur have been the large amount necessary, the uncertainty of its action even then, and its destructive action by reason of formation of sulphuric acid. About ten years ago a committee of the American Public Health Association reported a qualified approval of its use, provided from six to eight pounds were burned in two thousand cubic feet of room space. Later experiments have thrown more doubt upon its efficiency. Foreign governments have gradually given it up. Such experimenters as Roux, Pasteur. Koch and many others abandoned it, and those who still cling to it do so for want of something to take its place. As one health officer put it, "fumigation of some kind is demanded, and sulphur fumigation is the only kind which does any good, and so we use it. It is an advantage to have people think we are doing something."

This was the condition of things when, about five years ago, articles appeared in the foreign journals describing the disinfecting properties of formaldehyde.

This compound was discovered in 1867, and has always been of special scientific interest, as being the simplest one of the aldehydes, and possibly the starting point in nature for building up the carbohydrates. Its chemical formula is CH_2O and multiples of this give starch, grape sugar, cane sugar and all the carbohydrates.

For the first few years after the discovery of its antiseptic properties, the solution in water called formalin, formal, or formaldehyde, by various makers, was principally used, because of the difficulty of preparing the gas in sufficient quantity. But that difficulty was rapidly overcome and now it is possible to use the gas directly for house and room disinfection.

The gas shows its presence in a room by a sharp odor, and irritation of eyes and nose. It does not seem to be poisonous or injurious to colors or fabrics or metal work. As is the case with a new thing, great care must be used not to overestimate its power. There are already indications of this.

My experiments show that it must be strongly present in a room in order to be efficient. I do not regard it as safe to use less than one quart of wood alcohol to two thousand cubic feet of room space and prefer more than this rather than less. It unquestionably penetrates clothing better than sulphur fumes, but I cannot help thinking that the published cases of remarkable penetration are cases of faulty experimentation. I mean remarkable penetration with small amount of gas.

It must be remembered that experiments are made with dry cultures of bacteria as a rule, and drying is liable to kill them or very much weaken them. In our experiments we have had to constantly be on our guard against this. Then, again, cultures get weak by repeated cultivation, and more easily killed than fresh ones, such as would come from a virulent case of infectious disease. Wood alcohol is not very expensive and should be used freely The tank of my common generator holds two and one-half quarts, and my general advice is to fill it nearly full, even for a small room.

Of course, it is necessary for the gas to be quite closely confined to the room in question. If there are very loose windows or fireplaces open, these should be closed, and the door into the room should not be opened after one has made sure that the generator is working well. that is, after the first fifteen minutes.

Bedding or clothing should be treated in as small a room as possible, they being spread out as widely as possible. Books and drawers should be opened.

If these directions are followed carefully, I believe that formaldehyde will prove a great help to the sanitarian.

I have been asked whether it destroys moths and other pests in furniture or beds. My answer is that I do not know, but am very doubtful about it. It is not a poison to life indiscriminately, but only to bacterial life. I should expect that it would destroy eggs and perhaps recently hatched individuals of the vermin class, but not the developed animal. Further experiments will be needed to determine this.

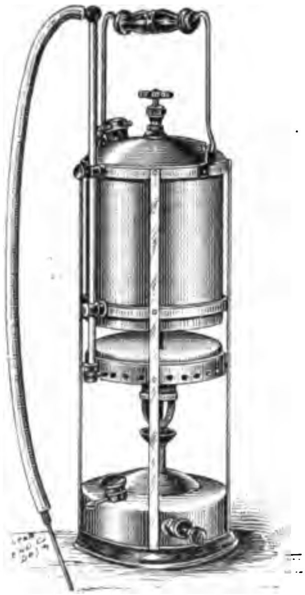
APPARATUS.

Since the discovery of formaldehyde inventive genius has striven to provide an apparatus for generating the gas that is efficient, durable, economical and adapted to the various needs required, especially local health boards.

SANITARY CONSTRUCTION COMPANY GENERATOR.

This apparatus consists of:

1. A closed receiver, preferably of copper.
2. A coil of copper pipe attached at one end to the bottom of the receiver (1), and at the other by means of a suitable connection with the room or apartment to be subjected to the germicidal action of the gas.



3. A valve to control the entrance of the coil (3) into the receiver.
4. A heating lamp.

MECHANICAL OPERATION.

A quantity of the solution of formaldehyde gas is placed in the receiver (1) and the receiver (1) is closed. The heating lamp (4) is lighted and the coil (2) is brought to a red heat. The valve (3) is then opened, and the formaldehyde solution contained in the receiver (1) is allowed to pass down and into the coil (2), which has been brought to a red heat, in a fine stream. Upon coming in contact with the heated metal the formaldehyde solution is instantly decomposed, and the liberated formaldehyde gas is further purified as it progresses through the incandescent coil tube (2) into the room or apartment to be subjected to the action of the gas.

CHEMICAL OPERATION.

Formic-aldehyde or formaldehyde CH_2O, the gaseous oxidation product of methyl alcohol, is a body extremely polymerisable; by the reunion of two of its molecules it forms a body known as para formaldehyde CH_2 O–CH_2O. In this form it combines readily with water, giving a solution with a strength of forty per cent by weight of the gas. This is the formaldehyde solution of commerce. To prevent the precipitation of the para formaldehyde in this solution, methyl alcohol, in the proportion of at least ten per cent, is added.

This para formaldehyde CH_2 O–CH_2O, stable in the solution at ordinary temperatures, can be broken up into its original CH_2 O, or formaldehyde gas, and this formaldehyde gas can be liberated from the solution by the application of heat. It would at first seem that it was only necessary to boil the solution in an open vessel, but in practice the operation presents many difficulties, for, after the boiling has proceeded for a few minutes, a second product of polymirization is formed, by the reunion of three molecules of formaldehyde, called trioxymethylene, a white semi-solid body containing in itself seventy per cent of formaldehyde, having very little germicidal power, and requiring a degree of heat much higher than that of the boiling point to break it up into the original CH_2O, or formaldehyde gas.

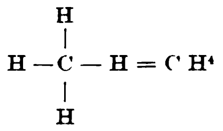
An attempt to remedy this difficulty resulted in the adoption of a closed autoclave, in which the formaldehyde solution was heated, and the resulting vapor confined until a pressure of at least two atmospheres with the corresponding temperature was attained.

This method was only partially successful, as it was not possible in practice to employ with the safety high pressures necessary to give the temperature required to completely break up the products of polymirization and resolve them into the original formaldehyde; and further, it was found that the ten per cent or more of methyl alcohol contained in the commercial solution of formaldehyde, united with an equal quantity of formaldehyde to form a product known as methelal, a body having no germicidal properties, and which reduced the quantity or volume of formaldehyde gas liberated from a given quantity of formaldehyde solution to a corresponding degree.

In the process herein described the pressure system is abandoned, and the degree of heat necessary to break up the polymerized products is supplied by means of an incandescent copper tube into which the formaldehyde solution is introduced in a fine stream, to be instantly vaporized as it comes in contact with the heated metal. As this vapor progresses onward through the tube it is thoroughly superheated, being brought to a temperature equal to at least one thousand degrees Fahrenheit, polymerized products are thoroughly broken up, and only the pure formaldehyde gas escapes.

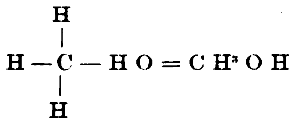
A further action of the intense heat in the copper tube on the solution is to convert the methyl alcohol contained in the solution, which would otherwise combine with an equal quantity of formaldehyde to form methelal, as previously described, into formaldehyde gas by partial oxidation, the action responding to the formula.

Methenane



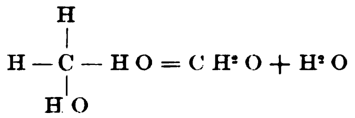
$$\mathrm{H}-\underset{\underset{\displaystyle\mathrm{H}}{|}}{\overset{\overset{\displaystyle\mathrm{H}}{|}}{\mathrm{C}}}-\mathrm{H} = \mathrm{C\,H^4}$$

Methyl alcohol



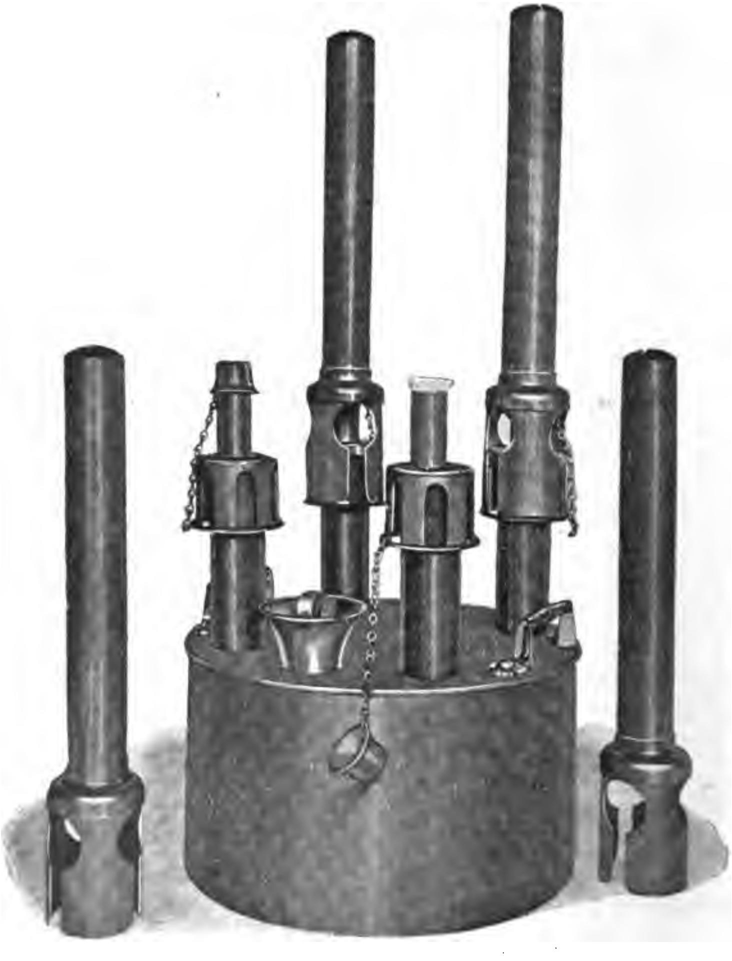
$$\mathrm{H}-\underset{\underset{\displaystyle\mathrm{H}}{|}}{\overset{\overset{\displaystyle\mathrm{H}}{|}}{\mathrm{C}}}-\mathrm{H\,O} = \mathrm{C\,H^3\,O\,H}$$

Formic aldehyde



$$\mathrm{H}-\underset{\underset{\displaystyle\mathrm{H\,O}}{|}}{\overset{\overset{\displaystyle\mathrm{H}}{|}}{\mathrm{C}}}-\mathrm{H\,O} = \mathrm{C\,H^2\,O} + \mathrm{H^2\,O}$$

THE MOFFATT FORMALDEHYDE GENERATOR.

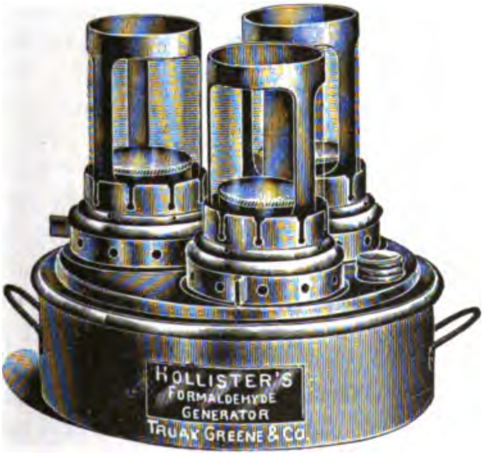


This apparatus produces formaldehyde vapor by the limited oxidation, that is, partial combustion of wood alcohol. The base is a receptacle into which the combustible material is put, and contains a wick to supply the alcohol to the upper part of the apparatus where it is subjected to limited oxidation. This upper part is a metallic contrivance consisting of a tube or chimney to promote the draft, and internal devices to regulate this draft. The formaldehyde vapor is thrown off from the top of this tube. The whole apparatus is adjusted when made so as to give the largest possible yield of formaldehyde. In operation the apparatus is self-regulating, and to be operated all that is necessary is to remove the upper part of the generator, light the wick and replace the upper part. The apparatus will then generate formaldehyde until the alcohol is exhausted. Since bacteria vary greatly in resistant power, and their destruction, to an extent, depends upon the character of room furnishings which may offer them degrees of protection, and again upon the ability to prevent a loss of gas through leakage of windows, doors, etc., no set rule can be laid down, but experiments of bacteriologists make it possible to accompany each instrument with instructions for successful disinfection.

The illustration represents size No. 3, suitable for health boards, small hospitals, and physicians.

THE HOLLISTER GENERATOR.

This apparatus consists of a metallic reservoir supplied with a wick which delivers the methylic vapor to the dome where it is mixed with the oxygen necessary for its perfect decomposition. The upper dome opening is fitted with a combination decomposing screen which, with the chimney, completes the apparatus.



No. 2.

Formaldehye and aqueous vapor are liberated according to the following equation:

$CH_4O+O=CH_2O+H_2O.$

There is no flame, hence is eliminated the possibility of fire, and the wasteful consumption of the fluid.

SCHERING'S FORMALIN DISINFECTANT AND DEODORIZING LAMP, AND FORMALIN DISINFECTANT.

FORMALIN LAMP.

FORMALIN DISINFECTOR.

With the Schering apparatus, the formalin is used in the shape of pastils (paraform), and can be used by any person. The pastils are vaporized by a new process, by which the formalin is given off in its gaseous and most active form. They contain one hundred per cent of pure formaldehyde. Thus a pastil weighing one gramme (15$\frac{4}{10}$ grains) develops one gramme (15$\frac{4}{10}$ grains) of pure formaldehyde gas, and therefore equals 2$\frac{5}{10}$ grammes (38$\frac{5}{10}$ grains) of the forty per cent fluid formalin. One gramme of pure formaldehyde gas as obtained by heating one pastil occupies a volume of seven hundred and forty-five ccm. (forty-five cubic inches).

The name "Formalin" has been given by the "Chemische Fabrik auf Actien, vormals E. Schering," in Berlin, Germany, to a forty per cent solution of chemically pure formaldehyde in water.

Formaldehyde (CH_2O), as is well known, is a gaseous body which is prepared by subjecting methyl alcohol to oxidation. It is readily absorbed by water; for this reason it is put on the market in the form of an aqueous solution termed "Formalin."

Formalin mixes with water in all proportions. It is, therefore, easy to prepare any dilution that is wanted.

Prof. K. B. Lehmann, of Würzburg (*Munchener Med. Wochenschrift*, 1893, page 597), after studying the properties and characters of formalin, recommended it as the best and safest, as well as the cheapest, preparation for disinfecting clothes, toilet articles and household goods, especially on account of the great extent to which it could be diluted and still preserve its activity.

The disinfectant lamp may be used in close living-rooms, especially such with damp walls; in sleeping rooms; sick rooms;

rooms where dead bodies have lain; in ships' cabins; in railway sleepers; in railway carriages and waiting rooms; in hotels and lodgings (important when traveling or in the country); in schools; in libraries; in business places; in restaurants; in privies (especially where there is no flow of water, or an insufficient one, as in small towns and in the country); in urinals, etc.

Also in meat markets, meat cellars; fish, game and poultry stores; slaughter-houses, pantries (especially in the country, where considerable quantities of meat, etc., must be kept for a varying time), milk cellars, etc.

The Formalin Disinfector is specially designed for disinfection on a large scale, for the complete disinfection and sterilization of large rooms, entire dwellings, and their contents; as also for the thorough disinfection of single rooms in cases where it is desirable to destroy the more resistant spores. It is constructed upon the same principle as the lamp.

These lamps are not cumbersome, and are easily handled. The small one can be carried in the pocket.

DR. KINYOUN'S FORMALDEHYDE LAMP.

Dr. Kinyoun's lamp consists of three parts; a lamp bowl, a collar containing converter, and a hood, and is constructed after the following manner:

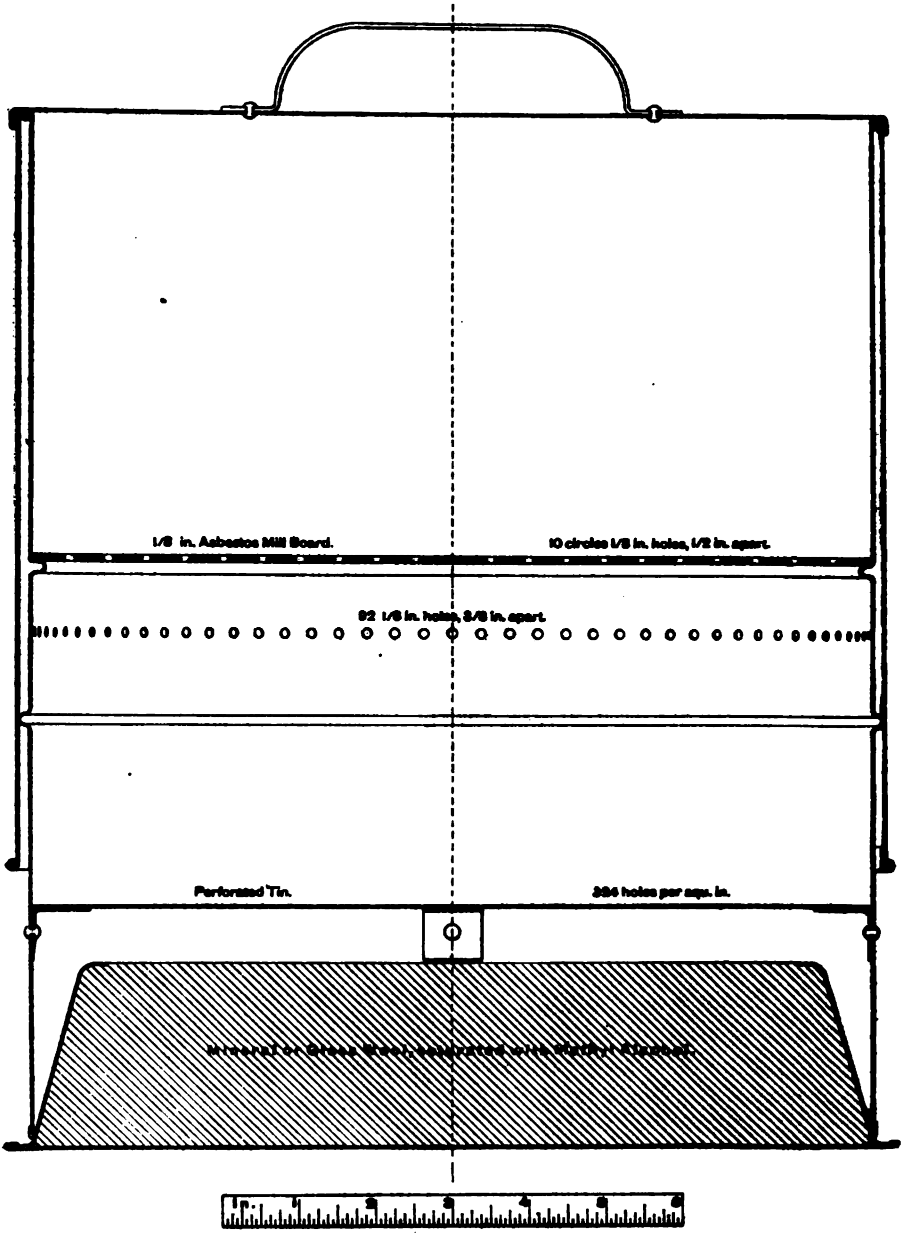
The lamp bowl is made from a five-quart milk pan and filled with ordinary mineral wool, such as is used for insulating pipe, etc.

The collar is made of sheet iron; the lower edge is made to fit closely over the shoulder of the lamp bowl eight inches above a number of perforations (ninety-two) for draught. Nine inches above a groove is turned on the collar, upon which lies a disk of platinized asbestos, supported by a number of cross wires. The collar is extended about five inches above this disk and acts as a chimney. Just about a half-inch above the top of the lamp bowl is inserted a disk of perforated tin. This acts as a damper or radiator and prevents the undue volatilization of the alcohol by heat from the asbestos disk.

A hood is also provided which fits closely over the top and extending down below the draft holes. The efficiency of the lamp lies altogether in the character and construction of the platinized asbestos disk.

This is made of an extra hard pressed asbestos millboard ⅛-inch thick, and is perforated with ⅛-inch holes one-half an inch apart.

The best asbestos for this purpose is furnished by the H. W. Zahn's Manufacturing Company, of New York.


1/8 in. Asbestos Mill Board.
10 circles 1/8 in. holes, 1/2 in. apart.
92 1/8 in. holes, 3/8 in. apart.
Perforated Tin.
324 holes per squ. in.
Mineral or Glass Wool, saturated with Methyl Alcohol.
In. 1 2 3 4 5 6

Formaldehyde lamp. Cross section.

Platinizing the disk—About $\frac{8}{10}$ gram of platinic chloride is dissolved in one hundred and fifty centimeters of alcohol or water. The disk is placed in a flat-bottomed vessel and the solution is then poured over it and allowed to thoroughly saturate it, after which it is placed in the iron collar and moulded in place. It is then ignited and the alcohol burned off. The perforated tin disk is removed and the collar placed over the lamp in the same position as if for heating it for disinfection. The alcohol is ignited and allowed to burn until the platinic chloride is converted into platinum black. It is then ready for use.

When the lamp is to be used the collar is removed and the required amount of alcohol is poured over the mineral wool; this readily absorbs the alcohol and prevents any free alcohol from spilling, should it be tipped over. It also prevents undue action of the flame should, by chance, it become ignited.

The collar is replaced over the lamp bowl so that one edge of the collar rests on the top of the lamp and a half an inch or so of air space is around the bottom. The hood is removed and the alcohol lighted. The lamp is allowed to burn freely until the platinized disk of asbestos begins to glow slightly, when the hood is placed over the collar slowly and then by means of the handle the collar is placed in proper position over the lamp bowl and pressed down so that the collar fits snugly.

After about thirty seconds remove the hood and observe whether the alcohol has ceased to burn. If not, replace the hood and again after thirty seconds remove, when the platinized disk should begin to glow and formaldehyde be given off. Sometimes, however, the lamp will ignite below at the draught holes and burn with a slight flame. This is caused by one of two things. First, the collar may not fit snugly around the lamp bowl; second, the perforated tin disk may have been heated too hot when the lamp was started. By placing the hood over the collar and waiting for about a minute this latter will be prevented.

It is intended that this lamp should be filled with the required amount of alcohol, placed in the apartment, started and allowed to remain for the full time of exposure. The air of the apartment can be neutralized by ammonia fumes and then opened. The results obtained by this lamp have been quite satisfactory, especially with regard to disinfecting apartments infected with diphtheria.

In concluding the description of his lamp, the doctor says he was not able at all times to disinfect the interior of pillows and mattresses with certainty, even when a very small room was used for this purpose and a large amount of methyl alcohol consumed. The surfaces, dust, etc., were every time rendered sterile.

QUANTITY OF ALCOHOL REQUIRED.

Not less than five hundred centimeters of methyl alcohol should be used for each one thousand cubic feet of space.

For disinfecting clothing and the light fabrics it would be well to put them in as small a space as possible and have the articles so arranged as to have all the surfaces freely exposed to the gas.

It is often required that a preliminary disinfection be given an infected apartment and contents before they are disturbed. This is, of course, a preliminary precaution which will, if properly performed, render the danger of dissemination of the infection less by sterilizing the surfaces of the articles. Lamps could be used advantageously in such instances for the preliminary disinfection of the surfaces of such articles which it would be necessary to remove and treat by other processes. When this is done the gas should be neutralized.

NEUTRALIZATION OF THE EXCESS OF FORMALDEHYDE GAS.

This is best accomplished by having a small tinned iron boiler, conical in shape, holding about three quarts, provided with a filling cock and tube on top. A rubber tube can be attached to this and fed into the apartment, through the door, preferably the keyhole. Ammonia water is poured into the boiler, stopcock closed, and then the boiler set in a bowl of boiling water. This will readily evolve the ammonia gas. A small kerosene lamp can be used instead of the boiling water.

In the Year Book of the Bureau of Animal Industry for 1896 is given the result of an extended series of investigations as follows:

"1. Formalin in concentration, $\frac{1}{10000}$, makes the growth of tuberculosis, anthrax, cholera, typhus, pus, and diphtheria germs impossible.

"2. In gaseous form a weak dilution is sufficient to check growth.

"3. A one per cent solution will kill pathogenic organisms in an hour.

"4. With a three per cent solution and the final use of alcohol it is possible to make the hands germ-free. Whether the skin of the hands is attacked by this method remains to be proved.

"5. Spraying with a formalin solution and subsequent inclosure of the articles in a closed space will easily sterilize them.

"6. Uniforms, etc., can be disinfected on a large scale without injury, twenty-four hours being required.

"7. Fæces are deodorized by a one per cent solution, and are in thirteen minutes germ-free; and buildings can be easily disinfected by a one per cent to a 1½ per cent volume of the gas.

"8. Formalin is a useful preservative.

"As compared with other disinfectants, such as corrosive sublimate, carbolic acid, etc., formaldehyde and its solutions have the advantage of not being retarded in their action by albuminoid matter, and of not injuring the articles to which they are applied. Their use, therefore, seems to be well recommended, and to fill many requirements which are not now fully met by other disinfectants. Especially is this the case in disinfecting rooms, clothing, bedding, railroad cars, etc.

"Experiments made by Roux, Trillat, and others upon the use of formaldehyde vapor for disinfecting rooms have been very satisfactory, in that the bacilli of anthrax, tuberculosis, and diphtheria have been killed within five hours by a saturated atmosphere of formaldehyde gas. After two days of thorough ventilation no odor remained in the room, nor were the objects which had been exposed to the action of the gas in any way injured. An objection to the use of formaldehyde has been raised because it adheres somewhat tenaciously to clothing and upholstered materials and the odor dissipates slowly. This, however, can be removed by thorough ventilation or by the use of a dilute solution of ammonia, which readily absorbs the gas. Placed in a room where formalin has been used as a disinfectant, this would cause a more rapid dissipation of the odor and would not injure the materials. It would seem that in formalin we have at hand the most useful disinfectant yet known, the application of which is a mere detail to be easily worked out in practice.

"It also appears to be useful as a means of preserving food, milk, etc. Its effect upon the digestive ferments has not been thoroughly studied, but the quantity used for preserving milk, one part to ten thousand, should be too small to give rise to any bad result, and none has been noted in practical use. Its influence in this connection should be carefully studied before it is generally recommended.

"While testing the action of this gas upon the cattle tick recently, its action upon the respiratory organs of cattle was noted. A calf was kept for five hours in an atmosphere containing about two per cent of formaldehyde gas. During this time there was a slight watering from the eyes, and it coughed occasionally, but it did not seem to be in any special distress and as soon as it was brought into the fresh air again it was al right and showed no bad after effects. This fact may prove of importance in disinfecting stables and the like.

"Another direction in which formaldehyde promises to be o practical importance is in the disinfection of imported hides which may carry contagion, especially anthrax. The rapid action and penetrating power of this gas bids fair to overcome the practical difficulties hitherto attending the use of disinfectants for this purpose.

"Experiments have shown that very much less than one pe cent by volume of the gas is destructive to injurious bacteria but an atmosphere containing one to 1½ per cent by volum will give satisfactory results in six to thirteen hours in al cases. When the volume of the gas is increased the length o time necessary for the disinfection is considerably decreased.

An experiment has recently been made by a medical authorit in the disinfecting powers of the vapor of formalin on librar books. His conclusions are as follows:

1. Books can be disinfected in a closed space, simply b vapor of commercial formalin, by using one c.c. of formalin t three hundred c.c. or less of air.

2. The vapor of formalin is rapid in its disinfectant actio The effect produced in the first fifteen minutes is practicall equivalent to that observed after twenty-four hours.

3. An increase in the amount of air to each c.c. of formali is not counterbalanced by an increase in the length of time o exposure.

4. In case the disinfection has been incomplete the vitality o the organisms has been so weakened that they survive only transferred in a few hours to media suitable for their development.

5. The use of the vapor of formalin is not detrimental, a far as observed, in any manner to the books, nor is it objectionable to the operator beyond a temporary irritation of the nos and eyes, somewhat similar to that produced by ammonia.

All the generators illustrated herewith were furnished Dr. Eli Grimes, Bacteriologist of the Iowa State Board of Health, for experimentation. The following is his report thereon:

DR. GRIMES' EXPERIMENTAL DISINFECTION WITH FORMALDEHYDE.

Formaldehyde is now so well known that it needs no introduction. The experiments of which the following is a brief report, were undertaken to determine the efficiency of this gas as a disinfectant and to ascertain the relative merits of the various forms of apparatus used in producing it for sanitary purposes. The tests were made, not in a laboratory, but in sleeping rooms with rugs, carpets, furniture and bedding in place, while all the conditions were made as nearly as possible like those of actual infection.

The infectious material consisted of growing and dry cultures of various pathogenic bacteria, tubercular sputum, fecal matter, pus, infected cloth, cotton, and threads prepared by soaking them in bouillon cultures and drying.

The bacteria used were those of anthrax, tuberculosis, pus, typhoid fever, cholera, bubonic pest and diphtheria.

The infectious material before mentioned was distributed throughout the room, beneath the rugs, under blankets, in mattresses and pillows, in crevices of the wall paper, freely exposed on tables, mixed with dust on shelves, and enclosed in books. After the apparatus was put in action the room was tightly closed and not disturbed till the expiration of the time that the experiment was to cover.

There are three methods of obtaining formaldehyde gas for disinfection. The one in most common use is that of generating it from wood alcohol by incomplete combustion. Another is to heat the solid or polymerized formaldehyde in the vapors of burning alcohol thus producing the gas. The third method consists in obtaining the gas from the commercial solution, formaline.

HOLLISTER'S DISINFECTING LAMP.

This is an apparatus that evolves formaldehyde from wood alcohol, the essential part being a platinum gauze which is kept heated by the alcohol vapor, thus effecting partial combustion.

TABLE OF RESULTS.

Capacity of room, 2,000 cubic feet.

	5 hrs.	10 hrs.	20 hrs.
Tuberculosis	v*	v	v
Pyogenes aureus	v	v	v
Typhoid	v	v	v
Cholera	v	v	Killed
Bubonic pest	v	v	Killed
Diphtheria	v	v	Killed

THE MOFFATT GENERATOR.

This uses wood alcohol, part of which is completely burned by means of an ordinary wick; this heats metal tubes through which the alcohol vapor is passed, mixed with a limited amount of air, thus producing formaldehyde.

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* v indicates that organisms were still virulent.

One tube burner gave the following results:

	5 hrs.	10 hrs.	20 hrs.
Tuberculosis	v	v	v
Pyogenes aureus	v	v	v
Typhoid	v	v	v
Cholera	v	v	Killed
Pest	v	v	Killed
Bubonic	v	v	Killed
Diphtheria	v	v	Killed

FOUR-TUBE BURNER.

	5 hrs.	10 hrs.	20 hrs.
Tuberculosis	v	v	Killed
Pyogenes aureus	v	v	Killed
Typhoid	v	Killed	Killed
Cholera	v	Killed	Killed
Pest	v	Killed	Killed
Bubonic	v	Killed	Killed
Diphtheria	v	Killed	Killed

SCHERING AND GLATZ'S APPARATUS.

The apparatus put on the market by Schering and Glotz is designed to volatilize paraform in the vapors of burning alcohol. By this means the solid form is converted into a gaseous form, sublimation being prevented to a great extent by the vapors of the burning alcohol.

The following results were obtained:

	5 hrs.	10 hrs.	20 hrs.
Tuberculosis	v	Killed	Killed
Pyogenes aureus	v	Killed	Killed
Typhoid	v	Killed	Killed
Cholera	v	Killed	Killed
Pest	Killed	Killed	Killed
Bubonic	Killed	Killed	Killed
Diphtheria	Killed	Killed	Killed

An attempt was made to use formalin, the forty per cent watery solution of the gas, as a room disinfectant. Formaldehyde forms with water a hydrate which is less penetrating and not so strongly antiseptic as the anhydrous gas. By heating the watery solution formaldehyde is not liberated but is vaporized as a hydrate, or becomes polymerized and is sublimed. The results obtained by evaporating formalin were in nearly every instance negative. In one series of tests an amount of formalin was used sufficient to give thirty cubic feet of gas or one per cent by volume of the contained air of the room. The liquid was allowed to escape from a stopcock and fall, drop by drop, into a dish kept heated by an alcohol lamp. The following results were obtained:

	5 hrs.	10 hrs.	20 hrs.
Tuberculosis	v	v	v
Pyogenes aureus	v	v	v
Typhoid	v	v	v
Cholera	v	v	v
Pest	v	v	Killed
Bubonic	v	v	Killed
Diphtheria	v	Killed	Killed

There are various forms of apparatus designed to use formalin to produce the gas. The one tested was that of the Sanitary Construction Company of New York. The principle involved is that of dehydrating the aldehyde with heat Formalin is heated in a retort and the vapor allowed to pass through a coil of metal tube kept at a bright red heat.

The following results were obtained by using an amount of formalin sufficient to give twenty cubic feet of gas, capacity of room two thousand cubic feet:

	5 hrs.	10 hrs.	20 hrs.
Tuberculosis	v	v	Killed
Pyogenes aureus	v	v	Killed
Typhoid	v	v	Killed
Cholera	v	Killed	Killed
Pest	v	Killed	Killed
Bubonic	v	Killed	Killed
Diphtheria	v	Killed	Killed

Prof. S. R. Macy, chemist of the Board, has suggested a very practical method that renders formalin of value in disinfection without the use of apparatus. The formalin is allowed to flow slowly over fresh unslacked ime. The water combines chemically with the lime, producing a sufficient amount of heat to prevent polymerization of the aldehyde. Much work yet remains to be done in establishing the efficiency of this method, but as far as tested it is equal to any now in use. In twenty hours tuberculosis, typhoid, pest, cholera and diphtheria were killed in every instance. The amount used being, as in the other tests, sufficient to produce a volume of gas equal to one per cent of the contained air in the room.

It will not be profitable to tabulate the results of other experiments. The conclusions can be briefly summarized as follows:

To disinfect a room a volume of aldehyde gas equal to one per cent of the oom space must be liberated in a short time, in a dry condition, and allowed o act at least twenty hours.

Books cannot be disinfected by this amount and time except superficially. n the tables given in this report books were not considered. Infectious material spread on the leaves of books, or on paper and placed in closed ooks was found to be virulent at the end of the twenty-hours test in most nstances.

Spores withstood the aldehyde in the majority of tests. Anthrax bacilli were used in all the experiments, but it was found that a greater amount of as and a longer time were required to kill them than were employed in btaining the tabulated results just given.

Pet animals often spread disease by carrying the germs in their fur. Cats. the fur of which was infected with diphtheria and typhoid germs were exposed in a room to the action of the aldehyde gas. In twenty hours heir fur was found to be sterile, while from the animals used as a control ure cultures of both germs were obtained. The animals were not injured by the action of the gas. When an animal presents the lesions of the disease. as cats with diphtheria, disinfection cannot be applied.

Formaldehyde is a powerful deodorant. In some practical tests of this roperty it was found that the amount required to deodorize a room had to e increased one hundred fold in order to disinfect it.

Three conditions must be considered when using this agent for disinfection. They are, amount used, time allowed to act, and presence of moisture. Moisture inhibits its action.

Diphtheria bacilli are killed by an amount much less than is required to kill other pathogenic bacteria.

In selecting an apparatus for disinfection it must be remembered that many of the "disinfectors" on the market are not only too small but are not constant enough in their action to give reliable results. The ideal disinfector is one which liberates a known amount of the aldehyde. In practical use the only means of knowing whether or not disinfection has been complete is to know the amount of gas actually liberated.

We are indebted to Dr. W. L. Bierring, professor of bacteriology in the State University, for kindly supplying the original stock of pure cultures of the pathogenic bacteria used in carrying on this work.

PROF. MACY'S METHOD OF GENERATING FORMALDEHYDE GAS.

When Dr. Eli Grimes, the Bacteriologist, and Prof. S. R. Macy, Chemist of the Board were experimenting with the various generators so kindly furnished by their makers, for generating formaldehyde gas, Professor Macy demonstrated a new, simple and apparently less expensive method of generating the gas, and applying it, than any yet presented to the Board. He describes it as follows:

All aldehydes have the property of combining with other substances, such as water, ammonia and nitrogenous compounds. In this property of formaldehyde lies its power as a disinfectant and deodorant. It is therefore very necessary to have an anhydrous aldehyde, that it may combine and thus disinfect and deodorize. This is impossible whenever the aldehyde comes in contact with moisture before it reaches the subject to be acted upon.

In all methods, save one, for the preparation of formaldehyde, water is to a greater or less extent evolved with the aldehyde, thus giving the opportunity for combination, resulting in the formation of a hydrate.

With a desire to overcome this difficulty I have begun a series of investigations, expecting to be able to retain the water in chemical combination and allow the formaldehyde to be evolved in the form of an anhydrous gas. I will describe briefly the process resulting from my investigation.

It is well known that lime (calcium oxide) unites with water, forming a hydrate and evolving great heat. This property enables us to produce formaldehyde gas quite free from water. The lime should be in one lump, with a cavity to receive the forty per cent solution of formaldehyde, which is allowed to flow at the rate of fifteen (15) to any number of drops per minute, depending upon the number of cubic feet of space to be disinfected. The forty per cent solution of formaldehyde may be placed in a bottle, and a syphon terminating in a glass tube, with an opening the proper size to control the flow.

After the solution has been dropping on the unslacked lime for some minutes much heat is produced by the union of the water with the lime, and the aldehyde is evolved in a dry state, which is most efficient as a disinfectant.

We do not claim that all of the aldehyde in a forty per cent solution is evolved in a dry state, but we know from our results that we get a greater yield than from any other process using the forty per cent solution, or methyl alcohol. The lime must be solid, and free from air-slacked lime. For every pint of forty per cent solution of formaldehyde, use 3¼ pounds of lime.

The investigations are to be continued and exact results given to the public.

AS A PRESERVATIVE.

In the United States Consular Reports, October, 1894, Vol. XLVI, No. 169, Mr. Louis Stern, Commercial Agent at Bamberg, says, concerning formalin:

"The technical journal issued by the Bavarian Polytechnic Society which is reputed to be the best of its kind in the kingdom of Bavaria, says formalin has demonstrated itself to be a perfectly harmless means for disinfecting purposes; for preventing and destroying the growth of bacilli. Its fumes are hurtful only when inhaled in considerable quantities.

It saturates animal tissues very rapidly and prevents their decay.

Meat, game, fowls, fish, etc., if dipped into a solution of formalin, remain fresh for a long period without getting a disagreeable taste or the odor of decay. Meat in which the process of disintegration has already begun, and which is in the first stages of decay, can be rendered odorless by simply dipping it into the solution for one or two minutes and washing with the same. The cause of the disagreeable odor is removed.

Regarding the use of formalin in the preparation of butter and cheese, sufficient data, the journal says, have not as yet been secured; but it has been shown to be very well adapted for cleaning the vessels and machinery employed in dairies.

Formalin is of special importance for slaughter-houses and meat-shops, for preserving fish and fruit during transportation. These must be dipped or placed for a short time in a weak solution of the chemical."

W. P. Hohenschuh, of Iowa City, chairman of the executive committee of the National Funeral Directors' Association, reported to the State Board a case coming under his care, of a woman weighing over two hundred pounds. She died February 9th. A fluid containing no metalic salts, and but seven per cent of formaldehyde, was injected into the body. It was kept in a warm room eight months. At the end of ten weeks the color and features were perfect, and at the expiration of eight months it was drying on the surface; the tissues were firm, and there was no odor from it at any time.

VETERINARY SCIENCE AND ITS RELATION TO THE PUBLIC HEALTH.*

Mr. President and Gentlemen of the Iowa State Veterinary Medical Association:

Your Secretary in asking me to present at this meeting a brief paper for your consideration, was kind enough to suggest the topic which I have selected—"Veterinary Science and its Relation to the Public Health."

My subject therefore naturally resolves itself into two general divisions.

1. Veterinary science.
2. Its relation to the public health.

It is but a comparatively few years since veterinary medicine has been lifted from a basal position among the professions—from the domain of rank empiricism to the honored and dignified position of a science—a noble, beneficent and liberal, if not literally humanitarian, science.

The whole world of science owes a debt of gratitude to Chauveau, Wesley Mills, Fleming, Liautard and a score of others because of their earnest, well directed and efficient work in the field of comparative anatomy and physiology.

Forty years ago, when I studied medicine and attended medical lectures at the Jefferson Medical College in Philadelphia and at the University of New York City, there was no instruction whatever in our text-books, or in the lectures delivered by the ablest teachers of the country upon these branches. The educated physician of that day knew little more about comparative anatomy and physiology than the uneducated "horse doctor" of to-day, or at least was not required to know more.

The whole science of medicine and surgery, whether applied to man or beast, is almost being revolutionized—and largely by experiments upon the lower animals. Every advance in

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***By J. F. Kennedy. A. M., M. D., Secretary Iowa State Board of Health, Des Moines, Iowa. A paper read before the Iowa State Veterinary Medical Association. Reprinted from the *American Veterinary Review*.**

preventive and restorative medicine is a benefit to both man and beast.

Prof. Wesley Mills, the able lecturer on physiology in the faculty of human medicine and in the faculty of comparative medicine of McGill University, Montreal, Canada. in an address to the graduates of the veterinary department of the university in May last, said beautifully and truthfully:

"Medicine is, as applied to man, no longer a system of blind empiricism, nor, as applied to the lower animals, a combination of that with farriery. The barber surgeon and the farrier are but landmarks in the history of the evolution of medicine. Gentlemen, there is but one animal kingdom, governed by the same natural laws, applicable alike to man and his fellow creatures, lower in some respects, in the scale, but sharing with him the liability to disease and death.

"Comparative medicine is the medicine of the future, and the sooner that is realized the better for man as well as beast. Indeed, we now grasp the future—the present touches its skirts. Specialism, or division of labor, will be necessary, because the powers of individuals are limited. Some will elect to treat the lower animals, and some mankind, with even further subdivision; but there is only one science and art of medicine; and all the various bodies of workers in this vast field should form but different battalions of one great army fighting for the prolongation of vigorous life and the mitigation of pain in every quarter to which the power of medicine can reach."

Medical men and teachers in our medical colleges are everywhere coming to realize these facts. The veterinarian of to-day, who has been properly educated, goes out from his college qualified not only to practice his profession, but to enter the best medical colleges in the land with advanced standing.

How changed the relation of the educated veterinary surgeon of to-day! The time was when, within my own memory, he was assigned a secondary or inferior place when compared with the human physician or with those of the other learned professions, but now the well-equipped D. V. M., everything else being equal, takes his place in the scientific, social, moral and commercial world along with the ablest jurists, physicians, clergymen and educators!

It seems to me from a diagnostic standpoint the veterinary practitioner should be even better equipped than the physician. The latter is greatly aided in his efforts to arrive at a proper diagnosis of the disease of his subject because of his ability to speak and to understand language. The subject of the veterinary surgeon, on the other hand, is mute. The character of the disease, its location and progress can only be learned by a sign-and-symptomatic language only acquired by patient study, thorough acquaintance with the anatomy, physiology and pathology of the animal, and by clinical observation; and these same qualifications must be adapted to the horse, cow, sheep, poultry, etc., as individuals differing greatly. Hence, though he may not be able to speak the language of the domestic animals, he must be able to readily understand their speech as voiced by their physical condition. Another reason why the veterinary surgeon should be thoroughly competent is that his subjects have no choice. They are entirely subject to the choice of their owners, who may from ignorance, prejudice, or mistaken economy select some one, if there are any such, who don't know the difference, anatomically, between a horse and a chicken, much less between a cow and a hog, and whose treatment is about as scientific. For this reason and because of the vast sums of money represented by the domestic animals of Iowa, the highest possible qualifications should be required of those who enter upon this practice.

It seems to me a burning shame that in this intelligent State of Iowa, and in this enlightened day, any man without any knowledge whatever of veterinary science, without knowing even the A, B, C of the anatomy of domestic animals, can swing to the breeze his sign as "veterinary surgeon;" and there is no law to inquire into his qualifications, and no power to regulate his practice.

The man or woman who teaches the farmer's children; the man who insures his property against fire and tornado, or his person against death or accident; the railroad corporation that hauls his produce to market; the bank in which he deposits his money; the dentist who pulls his teeth: the physician who treats himself and family, and druggist who compounds his medicine are all subject to statutory provisions, but when sickness and plague attack his flocks and herds and threaten their destruction, and endanger even the lives of his family, the law reaches out no guiding hand. The unprincipled and ignorant charlatan has an unchallenged standing before the law and often by his brazen effrontery and "stud-horse" advertisement enjoys a more generous patronage than his educated, competent and honorable rival.

It seems to me, therefore, that one thing the people of Iowa need is protection—legal protection against this dishonorable and dangerous class of pretenders, and you will pardon me gentlemen, if I suggest that it has seemed to me that you have been somewhat disposed to waste a good deal of ammunition in criticising some of your own advanced methods of experimentation, diagnosis and treatment rather than in closing up your ranks and making the united effort you should to secure the standing before the law you are so justly entitled to.

But enough on this point. Your "Relation to the Public Health" is a most important one, and is so far recognized by the State as to provide for the appointment of a State Veterinary Surgeon, and to make him a member ex-officio of the State Board of Health.

The State Board of Health and the Dairy Commission have large claims upon you. I hope the time will soon come when the latter, if it does not have it now, will have ample authority and financial aid to enable him not only to determine the butter fat in a given quantity of milk, for commercial purposes, but the sanitary quality of the milk, butter and cheese. I would go much further. I would not limit his function to the dairy, but I would make him a dairy and food commissioner, with adequate legal and financial backing to do thorough work. However, to do his present duty—to insure a wholesome quality of milk, butter and cheese, he must depend very largely, if not almost wholly, upon you. There must be inspection of the herds from time to time, as to their freedom from tuberculosis and other infectious and communicable diseases. Their food and drink, the condition of their stables, the methods of milking and of taking care of and marketing milk. In fact, all the sanitary or unsanitary environments must be known. The intelligent veterinarian is the only person from whom we would expect to get this information.

The State Board of Health and its auxiliaries, the local boards, are under the law charged with supervising and protecting the lives and health of the people; and as there are so many of the infectious diseases of animals that are communicable to man, you will readily see the great interest these boards have in your profession and work.

It is not necessary to take the time even to name the various diseases of domestic animals that are common, or at least communicable to man. You are perfectly cognizant of them.

Because their presence in the animal is a constant menace to the public health, the State Board of Health depends upon your profession largely for protection.

It is the proper function and duty of your profession to insure to the people of the State as early a recognition of, and as effectual protection against, the invasion and spread of these diseases as possible.

A great deal of distraction, demoralization and damage have arisen from the attempts to prove how extensively an animal may be diseased to render it unfit for human or animal food, especially in regard to such diseases as tuberculosis and actinomycosis and their ability to render meat and milk from animals so diseased dangerous.

I think there has been, in settling these questions, too much deference paid to those short-sighted breeders and stockmen who care but little what the ultimate results are so long as they can line their pockets.

Let me read to you what an able, honored and fearless member of your profession said in an address, as retiring president last June—I mean Dr. Harbaugh, of the Virginia State Veterinary Medical Association:

"We have," he says, "to fight a monster which stretches forth its arms in all directions and clutches with its grasp al who can be controlled by fear, favor or value received; and this monster is the wealthy breeding interest which makes a hobby of high-priced pedigreed cattle until it tires of them and then unloads them on the unsuspecting dairyman to infect his smaller herd with tuberculosis. Even from our standpoin there are two sides to this tuberculosis question. The first is the public health, and I care not whether a man believes there is much or little danger in using the milk or flesh of tubercular animals through risk of transmission of the disease to th human being, it is certain that such milk and flesh ought not to be used. Milk is a part of the cow, and therefore animal matter, and if the cow is tuberculous her milk is part of a diseased cow, and should not be used for human food. The same proposition applies to meats from tuberculous animals, no matte how thoroughly sterilized, and it disgusts me to hear our would be veterinary politicians talk of using such meats the same a they do for the lower classes of Europe, when we have meat t spare for the world. No, gentlemen, we are not in Europe and do not have to devour diseased products to prevent starvation. Let us be consistent, and fight against all diseased animal products being used for human food.

"Another thing that surprises me is that there are veterinarians occupying high places who have the effrontery to tell us milk from tuberculous herds, when fed to pigs, produces the same disease in them, and that there is little danger of producing it in human beings!

"These are breeders' opinions, whether uttered by veterinarians, agricultural journals or other hirelings. No man who sees the post-mortem lesions of a few tuberculous cows wants milk from any such animals in his house, danger or no danger."

I like Dr. Harbaugh for his sensible views, so fearlessly and forcefully expressed.

The farmers of this State, especially the hog raisers, are appealing to you to protect their swine against the ravages of that fearful disease, hog cholera, that often in a few days sweeps as with the "besom of destruction" not only their hope of added wealth, but often the only means of retaining their homes.

There is one line of investigation and experimentation in connection with this particular disease that I wish to specially emphasize—I mean the great similarity, if not identity, of hog cholera and typhoid fever as it is manifested in the human subject.

Our honored State Veterinary Surgeon, Dr. Gibson, at a late meeting of the State Board of Health, read a most interesting report prepared by Dr. W. T. Wright, of Vail, Crawford county, detailing an outbreak of typhoid fever in a farmer's family near Vail. The father and four daughters, who lived at home, and another daughter who was visiting in the family, were all taken with typhoid fever—only two of the family, the mother and a young son, escaping. The father died—all the others, after a lingering illness, recovered. The well that supplied the family, as well as the stock, with water was situated in the lowest portion of the hog lot. The father and five daughters who were attacked with the disease used freely of this water. The mother and son, who did not use it at all, escaped. Previous to this outbreak of typhoid fever the hogs kept in this lot had had hog cholera in a severe and fatal form. Dr. Wright was led to examine carefully the symptoms present in the hog cholera cases and was struck with the marked similarity between the symptoms of these typhoid fever patients and the cases of h cholera, and was driven to the conclusion that there was mu kinship, if not identity, between the two diseases.

It seems to me that it would be well for the bacteriologi of the State, physicians and veterinarians to thoroughly t this matter. The presence of typhoid bacillus or one akin to should, if present, be readily detected in the excreta of the h during such an attack. Should such identity be established, would not be hard to adopt more rational methods of preventi and cure. But I cannot particularize any further. If the co pliment of an invitation to prepare this paper has embolden me to proffer advice, to call attention to matters outside limited sphere, or to presume to tell you "what manner of me you ought to be, you may simply regard it as a blooming ill tration of the saying: "Fools rush in where angels fear tread."

BOVINE TUBERCULOSIS.

The last Biennial Report closed with a partial report investigations being made of tuberculosis among cattle, and milk and the tuberculin test.

In July, 1896, the State Dairy Commissioner, upon requ of the health officer of the city of Ottumwa, made an inspecti of the milk supply of that city and asked the bacteriologist the Board, Mr. J. Christian Bay, to make bacteriological te of the milk with a view of ascertaining whether any of t tubercle bacilli could be found in the milk. There were s mitted to Mr. Bay a number of samples, some of which w mixed or composite samples, and others from individual co Mr. Bay submitted his report to the State Board of Heal from which is reproduced the following, relative to the resu of his examinations:

> "I have examined, so far, five hundred and sixty-three samples of m Of these, three hundred and fifty-nine were from individual cows, and hundred and four from herds; that is, composite samples.
>
> "The samples were taken in forty or one hundred cubic centime bottles, and each bottle was at once marked by the inspector, in such a that the cow from which it came might be at any time recognized.
>
> "First, the inspector took samples from the milk cans belonging to different dairymen at the place. If any of these samples were found t

contaminated, the herd, or rather the milk, was kept in quarantine until the individual cows of the same herd had had their milk examined. Those whose milk gave positive response to the test were ordered removed and their milk prohibited from the market.

"*Of the two hundred and four composite samples, four, that is, about two per cent, were contaminated; and of the three hundred and fifty-nine samples from individuals, fifty-one were contaminated, that is fourteen and two-tenths per cent.*

"Should I venture to deduct any results from the facts now recorded, I should emphatically say that bacteriological analysis of milk are not sure criteria respecting the distribution of tuberculosis among cattle. I would say, however, that as long as we do yet know very little of the important laws governing the disease, and as long as the public mind and the public treasury are not prepared to undertake radical measures to eradicate tuberculosis, bacteriological examinations of milk supplies might tend to point out the cores of infections at the different places, and to point out certain—but by no means all—infected cows. Investigations along this line, if properly supported, also tend to deepen our knowledge of the entire question, and certainly are of benefit to public health in so far that the infected milk is prohibited from sale and thus from disseminating the disease. The general public is slow in comprehending scientific facts, and its mind is easily turned against what it does not understand. We, depending upon the public for the support of our work, should be very careful in regard to our proceedings in arresting the spread of consumption. We should reform, but not revolutionize."

Believing that the investigation of the bacteriologist should be supplemented by the application of the "tuberculin" test, it was suggested to the health board of that city that the Governor be requested to send the State Veterinary Surgeon, Prof. M. Stalker, there to apply this test. It was done, and the following is his report:

To the Honorable Board of Health of Ottumwa, Iowa:

GENTLEMEN—I am able to make the following report of work done to date in testing the condition of the dairy herds supplying milk to your city:

You will recall the fact that some six weeks ago your board decided to have the character of the milk supply of the city tested. To this end you caused to be made a number of microscopic examinations of milk taken from different herds. These tests were made with special reference to determining whether the cows supplying milk were affected with tuberculosis. First, composite samples taken from the milk supply of the entire herd were examined, and later, milk from individual cows was subjected to microscopic examination. So far as I have been able to collect the statistical results of these examinations, they are as follows:

Herd of F. and H. Michaels, examined twenty-seven, condemned as tuberculous six.

Herd of C. J. Prosser, examined nine, condemned as tuberculous six.

Herd of Ed. Daggett, examined forty-three, condemned as tuberculous four.

Herd of G. M. Newman, examined twenty-two, condemned as tub culous three.

Herd of James Hatch, examined twenty-nine, condemned as tubercul three.

Herd of H. Montague, examined twenty-five, condemned as tubercul two.

Herd of James Marsh, examined nineteen, condemned as tubercul three.

Herd of J F. Bizer, examined twenty-two, condemned as tuberculous o

I believe these are the correct figures, and in any event the variatio not such as would change general results.

After this test was made, and the sale of milk from a portion or al the cows pronounced diseased was forbidden, your board resolved to h an additional examination. In order to accomplish this Dr. Baker, y health officer, on behalf of the board, made a formal request of the G ernor to send the State Veterinarian to conduct this test. In accorda with instructions received from the Governor I have caused a careful of all suspected herds to be made. What is known as the tuberculin was employed, and I submit herewith the results of the examination. the herds tested all cows, both those pronounced diseased and those kn to be healthy so far as examination of milk was concerned, were jected to the test. The herds owned by the following named par showed no reactions and are declared free from tuberculosis:

F. and H. Michaels, Ed. Daggett, James Hatch, Jacob Marsh, J. Prosser, G. M. Newman, H. Montague.

In the herd of J. F. Bizer eight animals reacted to the tuberculin and were condemned as tuberculous. Seven of these, one not being to walk to the slaughter house, were sent to the packing house of J Morrell & Co., of your city, and slaughtered under the direction of a Un States inspector employed by the Bureau of Animal Industry. These se individuals were found on slaughter to be affected with generalized tu culosis, and had the United States condemnation tags attached to the casses and sent to the rendering tanks. They were all in full flow of n and two were affected with extensive tubercular condition of the ud though there were no external evidences of the fact. One animal in herd was pronounced tuberculous by examination of the milk. This i vidual failed to respond to the tuberculin test.

In addition to the above described animals, the Jersey herd of J. D. F was tested and found to be free from disease. The herd contained fif cows.

To recapitulate: Nine herds have been tested, containing two hun and eleven individuals *Of this number twenty-three cows in seven herd been condemned as tuberculous by examination of milk. Not one of the demned cows responded to the tuberculin test. Of the eight cows in the J. F. herd found to be tuberculous all had a clean bill of health under examinati milk, though two of them on post mortem examination were found to be af with generalized tuberculosis involving the udder.*

Test of a few additional herds will be made, on which I will report later date. I am yours very truly,

M. STALKER,
State Veterinaria

In these reports there is an apparent sharp conflict [see page] between the veterinary and bacteriological departments of ne State Board. Not so.

It was an honest trial of the two methods recommended by rominent experimenters in their respective fields of explora- on. If the two tests, applied side by side to the same individuals a herd, should show the same results, the value of both ethods for determining tuberculosis, the one test supplement- g and corroborating the other, would be incalculable.

In this particular case the preference must be given to the berculin test since all the animals condemned by it were, on post mortem, found to have tuberculosis. These same imals by the microscopic test were regarded as healthy. The st mortem proved the error of the finding by the microscopic st and confirmed the tuberculin test.

The State Board of Health, upon what seemed to be incon- stible evidence, has approved and adopted the tuberculin st. It is waiting the establishment and reliability of the her.

RESULTS AT THE EXPERIMENT STATION.

State Veterinary Surgeon Stalker and his assistant, W. B. les, give the following as their experiments at the Agricul- ral College Experiment Station:

EXPERIMENT STATION TESTS.

It is our intention to give conclusions drawn from tests and periments made at our station, as well as to present in a con- nsed form some additional and well-established facts on the bject of tuberculosis.

The interests involved are so vast, and the adoption of wise d efficient measures are so important, the subject should ceive the fullest discussion with all the available facts before . Personal interest and preconceived notions should not be owed to influence our judgment. Recent discoveries and the plication of new methods growing out of them have led to e fear on the part of some that great harm is likely to be done e live-stock interest. While much misleading and unprofita- e discussion has been going on, science has been patiently serving facts and bringing new discoveries to light.

Some points have been effectually settled, truth has been proximated on others, and yet there remain for settlement ny of the practical details in dealing with the subject.

The scientific aspect of the question has made more uniform progress than the practical application of the facts discovered to the eradication of the disease. The scientist has only the difficulties of discovery to encounter. A variety of interests may be antagonized by the efforts at suppressing the disease and consequent opposition developed.

Within the last few years there has been a general awakening to the vital importance of this question all through the scientific world. The laboratories of the old world and the experiment stations of the new are abundantly supplied with devoted students of sanitary science who are bringing every available means to bear on this question. From these diversified opportunities and fields of observation the problem is being gradually wrought out.

Investigators working independently of one another have arrived at the same conclusions on a number of points. This method is sufficiently conclusive in its results to set at rest discussion among scientists as to the trustworthy nature of the conclusions, and to furnish an intelligent basis for restricting the evil. It may be well to summarize at least a partial list of facts on which experimenters are so well agreed as to leave little doubt as to their accuracy. Much of the ground has been gone over by the Agricultural Experiment Stations of the more progressive States, with remarkable uniformity as to results.

The following may be said to cover a portion of the ground that has been practically cleared from doubt:

(1) Tuberculosis of the lower animals is identical with human consumption.

(2) It is an infectious disease.

(3) The disease may be transmitted from man to the lower animals, and from the lower animals to man.

(4) Tuberculosis causes more deaths in the human family than any other disease.

(5) Cows are especially susceptible to the disease, and are extensively affected by it.

(6) Milk from tuberculous cows may convey the disease to the consumer.

(7) Milk from tuberculous cows having non-affected udders may convey the disease.

(8) The flesh of tuberculous animals may convey the disease.

(9) A large proprtion of the cases cannot be recognized by inical examination.

(10) No other test yet discovered than that afforded by ıberculin, can detect any considerable proportion of cases in ıe living subject, and this test is practically infallible.

(11) Injections of tuberculin cannot produce tuberculosis, ır are the results harmful.

Any one of these asseverations can be successfully defended y observations made on the part of experimenters of unquesoned credibility. Most of them have been verified in our own ation work.

It is now about a year and a half since the station began the ork of applying in a practical way, and on a somewhat extenıve scale, the tuberculin test. The purpose has been to satisfy urselves as to the reliability of the test, the danger if any, esulting from its use, and by conducting a series of tests in arious parts of the State to gather information as to the prevlence of the disease.

METHOD OF APPLYING THE TEST.

For the benefit of those not familiar with the methods of ıaking the test, a word of explanation will be in place.

First.—The temperature of every individual in the herd to e tested is carefully taken and recorded at intervals of two ours during the day preceding the test. The average of these eadings will give a pretty accurate test of the individual temerature of the several animals, which is recorded as the normal, ith which any variations are to be compared. Before midight of the day on which the trial temperatures were taken, ıe injection of lymph is made. This consists in injecting eneath the skin, with an ordinary hypodermic syringe, two ubic centimeters of tuberculin for every thousand pounds live eight of animal. The result to be expected is a more or less ell marked rise in temperature shown by all individuals ffected with tuberculosis. If the animal is free from the disase, no change of temperature will result. The rise in temerature will usually begin to manifest itself in from twelve to fteen hours after the injection is made. From four to six ours later, the temperature in those showing reaction begins) decline and gradually reaches the normal. It is upon this ariation in temperature alone, that reliance is placed for etermining the presence of the disease. Every possible preaution should be observed, that the conditions may be the same under which the temperature was taken, before and afte the injection. Varying conditions tend to slight modificatio of temperature, hence the necessity for the greatest precaution that only the change resulting from the action of the tuberculin may be shown.

If a change of one and a half or two degrees occurs, this i sufficient evidence on which to condemn the animal. A rise o four or five degrees is not unfrequently noted. There is n well authenticated evidence that these marked differences i rise of temperature shown correspond to like difference in th severity of attack.

RELIABILITY OF THE TEST.

With this feature of the subject, we are especially interested If the results obtained should not show a fair degree of uniformity under like conditions then the test may be discarde as useless. If the test proves a means of condemning health animals it is a harmful and dangerous experiment and shoul be discarded at once. If diseased ones fail to respond to th test, then it is to be regarded as a means of concealing rathe than pointing out real dangers, and is worse than useless. Wit these thoughts before us, the work has been done with suc attention to details as would insure a fair and impartial trial.

The conditions under which we have been obliged to wor have not always been such as to allow all the privileges w could have wished for, in order to obtain the fullest result It has not always been possible to secure for slaughter all th animals showing reaction. And as a matter of course we hav not had the opportunity of performing autopsies on any co siderable number of those that failed to show any reactio These are regarded as healthy and are not usually disposed in a way to afford opportunities for post mortem. Out of eight post mortems made on animals showing reaction, not a sing case failed to give evidence of tuberculosis. And in no cas where an opportunity was afforded to examine the carcass one failing to show reaction, was the disease found to exist. I other words, the test has not failed in a single instance in ou experience. Occasional failures have been noted by othe experimenters. Whether this was due to lack of attention details in the work, to want of searching methods in examinin the cadaver, or to actual failure in the essential features of th test, we are not prepared to say. But it would not be a matte for surprise if there should be some contradictory resul reported, owing to the many inexperienced hands into which the test has fallen. Our experience with the test, however, tallies so closely with the results obtained at other U. S. experiment stations, as well as scientific institutions throughout the world, that it may be said there is practically no disagreement among the workers in this field of investigation, as to the uniformity of the results. It may not be said of any drug in the pharmacopœia, that it is infallible in its action; that it was never known to produce other than its generally recognized effects, and that these invariably followed the administration. But this by no means breaks the law of uniformity or reverses the rule of action.

The New Jersey experiment station in its Bulletin after detailing experiments made, summarizes its conclusions by saying: "Every case of undoubted reaction proved to be undoubtedly tuberculous."

The Wisconsin station, where careful tests have been made, publishes the results in bulletin form and gives expression to the following: "We have then in this agent a means of detecting the disease if we desire. The use of this agent is to be recommended."

Dr. Law, in a bulletin issued from the Cornell University Station, speaks of tuberculin as possessing "the highest value as a test of tuberculosis in animals." He further says in the same bulletin: "This has now been employed on thousands of cows, and those who have used it most, value it most highly, whereas many who at first reported reactions in non-tubercu- ous animals are now acknowledging with Nocard that the fault has been mainly their own, for small tubercles were present but were overlooked through their failure to examine the bones and other organs."

The same observations have been made by workers in the Maine Agricultural College Experiment Station. In the pub- ished reports of that institution we read: "With suitable nstruments and professional skill it is comparatively easy for one man to examine a herd of fifty animals in less than twenty-four hours and detect every case of tuberculosis that may exist here."

The Massachusetts Station, after a long and unsatisfactory attempt to rid the college herd of tuberculosis by the weeding-out process, decided to apply the tuberculin test. The bulletin of he station in speaking of the effort to free the herd from this disease without the application of the test, says: "That in a probability we should never have been able to accomplish th is shown by a study of the records of the tuberculin test Both those that reacted and those that did not we slaughtered, and the accuracy of the test fully demonstrate

The North Dakota Experiment Station through its bullet says: "We have taken pains to hold post mortems on all a mals which have been tested up to date which yielded to t test, and in every one we have been able to demonstrate t presence of tuberculosis."

The conclusions of the Bureau of Animal Industry are th summarized: "The number of instances in which the co ditions indicated by the results of the injection do not confo to the conclusions founded on post mortem examination is many times less the number of errors from all other metho used to diagnose tuberculosis, and there are so many cases tuberculosis which could not possibly be detected by any oth method, that even they who are least inclined to favor the u of tuberculin cannot fail to recognize its importance."

Our own station has had similar experience in dealing w the disease at home. No other means employed ever enab us to free the college dairy herd from the disease. In ev instance where post mortem proofs have been added to the fi ings of the tuberculin test, they have coincided. It is necessary to multiply at length quotations from independ experimenters. They are to one and the same effect. But have thought it worth while to present a very little of mountain of evidence in support of this test to offset the reite tions of the objector. I have cited the most unbiased trustworthy evidence; the observations of men employed by government who have no occasion to become swift witnesse support of any theory or any practice. Investigations car on by the station authorities of Minnesota, Virginia and Arizo the sanitary board of the Dominion of Canada, and many ot government stations and scientific bodies throughout the wo might be drawn upon for added evidence to the proofs alre furnished.

EFFECT OF TUBERCULIN ON THE HEALTH OF THE ANIM

The statement has so frequently appeared in print that use of tuberculin is harmful, that it induces tuberculosis, e that the results of our experience seem worthy of mention.

During the Fall of 1894 ten cows that had previously reacted to tuberculin received a second and a third injection. These animals were situated on different farms, and received the same treatment as the balance of the herd. No bad results followed in any way, and in no case was the process of the disease apparently hastened.

During the Spring and Summer of 1895 three cows have been receiving regular injections of tuberculin. At this writing no unfavorable results have been shown.

Dr. Pearson, of the Pennsylvania Experiment Station, says, in discussing the probable danger from the use of tuberculin: "The experience of the State College Agricultural Experiment Station herd is also against this theory, because its members have now been tested with tuberculin three times, each time being injected in practically the same spot, and not the slightest evil result has manifested itself, although the period of observation now extends over two and one-half years."

A bulletin issued by the Experiment Station of Cornell University, after detailing a series of experiments on this subject, says: "So far as there is evidence before us, everything points to the harmlessness of a single test dose on a sound animal system."

The experience of the Minnesota Station furnishes conclusive proof of the same nature.

THE UNCERTAINTY OF OTHER TESTS—THE MILK TEST.

It has not been alone the purpose of the Station to prove or disprove the reliability of the tuberculin test, but to compare its value as a diagnostic agent, with other means of recognizing the disease. To this end a large number of tests have been applied to cows from which samples of milk had been subjected to examination.

Much has been said through the public press in favor of this method of detecting the disease and determining the dangerous quality of the milk. Samples of milk taken from cows in charge of the experiment station, which are known to be tuberculous were submitted to microscopic examination. These samples were declared to be free from the bacilli. This being the microscopic test of contamination there could be nothing done but to pronounce such samples free from danger as far as this test applies. However, as above stated, the cows have been proven tuberculous beyond question. Again, in ten herds where from five per cent to more than fifty per cent had been pronounced tuberculous by the microscopic examination of the milk, not a single case of tuberculosis could be found by the most painstaking test. Conversely, eight cows in one herd were proven by the tuberculin test to be affected. They were slaughtered and all gave the unquestioned proof of being tuberculous. These had passed the ordeal of microscopic test of milk with a clean bill of health, though two of them were found on post mortem examination to have miliary deposits throughout the udder.

These experiments have convinced us that the plan of microscopic examination of milk is altogether untrustworthy as a means of detecting the disease.

PHYSICAL EXAMINATION.

In cases where the herds were being subjected to the tuberculin test, careful physical examination of suspected and non-suspected cows have been made. These tests have proven to us that it is impossible to detect any considerable proportion of the cases in an affected herd, by the most careful examinations of this nature. Cases that have presented no evidence to the sense on which to condemn, or even to suspect the presence of disease, have reacted to the test, and post mortem examination has in many cases revealed extensive tuberculous lesions. These have been found in all parts of the body, including extensive diseased conditions of the mammary glands.

EXPERIMENTS IN FEEDING THE MILK OF TUBERCULOUS COWS.

The use of milk on experiment animals for the purpose of artificially inducing the disease in otherwise healthy individuals is a practical way of putting to the test some of the theories as to sources of danger. If the milk from tuberculous cows, either taken in the ordinary way or injected directly into the circulation, can induce tuberculosis, the fact becomes one of no ordinary moment. The significance of the experiment has a two-fold importance.

First.—It enables us to account for many cases of the disease in young cattle. It has been shown by repeated observations that congenital infection is rare. However, calves but a few months old are frequently found to be infected.

Second.—If milk from tuberculous cows possesses infectious properties, the health and safety of the human family become the important part of the question. If feeding the milk to lower animals under ordinary conditions will induce the disease, there is no avoiding the conclusion that it can be induced in the human family under the same conditions. This experiment has been repeated with sufficient frequency, and under conditions to prove the certainty of results beyond question. If milk is contaminated with the bacilli of tuberculosis, it will convey the disease. But under what conditions the milk will be so contaminated, is a question for separate solution. It has been vehemently claimed that only milk from cows with udders in which the disease was localized was to be regarded as in any sense dangerous.

An exhaustive series of experiments was undertaken by the Trustees of the Massachusetts Society for the Promotion of Agriculture, with a view of gaining light on this question. One of the experiments consisted in feeding twenty-one healthy calves on milk from tuberculous cows. At the conclusion of their experiment they report: "Of these twenty-one animals, eight, or over thirty-three per cent, were shown to be tuberculous. That the cows from which the milk for these feeding experiments was derived were free from tuberculosis of the udder is shown by the results of the post mortem examination." They draw the following conclusions:

"The possibility of milk from tuberculous udders containing the infectious elements is undeniable."

"With the evidence here presented it is equally undeniable that milk from diseased cows with no appreciable lesion of the udder may, and not unfrequently does, contain the bacilli of the disease."

Dr. McKenzie reports that in cases where there were no lesions of the udder, but where tubercular deposits were found in other parts of the body, the milk in forty per cent of the cases proved to be infectious.

This is in accord with the best evidence on this subject, and especially does the extensive scientific work of Bang, of Copenhagen, coincide with these results.

Our station made experiments on three calves from tuberculous mothers. Two were allowed to take the milk from the mothers. These cows were but slightly affected, the udders to all appearances being free from disease, and no bacilli were detected in the milk when examined under the microscope. Both of these calves developed tuberculosis. A third calf from a tuberculous mother was not allowed to take the mother's milk, but was taken as soon as born and kept on the milk of a cow that had been tested and found to be healthy. This calf never showed reaction when tested with tuberculin. It was slaughtered at the age of three months, and thorough examination failed to detect any sign of disease.

This experiment tends to show that calves from tuberculous mothers are not necessarily tuberculous at birth, but that infection will take place when the udders are healthy and when there is no external evidence of disease.

ORIGIN OF THE DISEASE IN IOWA.

It is quite impossible to trace accurately the appearance o the disease in our State. We have known of its existence among our cattle for twenty-five years, and undoubtedly i traces back to a very early period in the history of our cattle industry. We first became acquainted with it in herds of wel bred cattle, especially those that were represented by importe individuals. Comparatively little was known at that time o the history and real danger from the disease, and nothing o the modern methods of detection. But long before there were any laws on our statute books making provisions for control of contagious diseases, we assisted many of our breeder in their endeavors to get rid of tuberculosis by selecting ou and destroying the affected individuals in their herds. Th introduction of imported animals was doubtless an importan factor in the introduction of the disease.

TO WHAT EXTENT DOES THE DISEASE PREVAIL IN IOWA?

The work done through this department during the las eighteen months, the occasional discovery of a seriousl affected herd, and more frequently less severe outbreaks hav led to the frequent repetition of this question.

While a considerable number of tests have been made, an these in various parts of the State, we are not yet in possessio of a sufficient amount of evidence on this point to furnish mor than an approximation to a definite answer. The evidence the existence of tuberculosis has been demonstrated over an over, but to attempt to deal with percentages would be to ente the field of conjecture. It must be kept in mind that tes have been made where some form of disease was known t exist or was believed to be present. The unsuspected he has not, as a rule, been tested. Under these circumstances t number of cases found to be diseased in proportion to the who

umber tested will greatly exceed the general average of cases
n the State to the entire number of cattle. Again, the propor-
ion of affected individuals in a diseased herd varies greatly.
The time during which the disease has existed, the conditions
nder which the animals have been kept, whether closely con-
ined or in the open fields; these and many other conditions
vill have a marked influence on the degree to which the herd
as been invaded. We append the figures taken at random
rom tested herds that will show the extent to which the dis-
ase prevailed in these instances.

About fifty herds have been tested in the counties of Black
Iawk, Kossuth, Story, Boone, Page, Harrison, Sac, Wapello
nd Floyd. Taking eight hundred and seventy-three animals
s they occur in these herds that were subjected to the test,
ne hundred and twenty-two reacted and were pronounced
uberculous. These facts give some suggestions as to the
istribution of the disease, and the per cent that may be rea-
onably expected to react in herds that are reported for exam-
nation.

HOW THE INFECTION IS EXTENDED.

A living vegetable organism, the bacillus tuberculosis, is
he reproductive agent which gives rise to the disease. When
his germ finds lodgment in suitable tissues, and is uninter-
upted by any antiseptic agent, or opposing force, it tends to
ultiply with a certain degree of rapidity, and the results in
he affected tissue is the deposit of tubercle. Any organ of
e body may be assailed, though lymphatic and other gland-
lar tissue, the lungs, liver and spleen are parts particularly
rone to be the seat of disease. Any animal affected with the
isease becomes a center of infection from which the disease
ay spread. Its distribution is never rapid, but a single case
a herd is certain to be followed by others in the course of
me if unrestricted cohabitation is allowed. The bacilli are
ughed up or expelled from the body through other channels.
hese may be at once conveyed to the body of a susceptible
nimal, or they may lie in a dried and dormant condition for
onths and be revived into activity when implanted in a suita-
le soil. Every individual going out from an affected herd
ecomes a menace to the animals with which it is brought in
ontact. Doubtless the sale of breeding stock has had more to
o with the general distribution of the disease than any other
ne agency. A general indictment cannot be entered against

the breeding stock of the State, but many of our breeders can testify to the trouble they have experienced in their endeavor to free their herds from the scourge.

INFLUENCE OF MANAGEMENT ON EXTENDING INFECTION.

The fact is admitted by investigators generally, that the character of the buildings exerts a certain influence either for or against the dissemination of the disease. It is a universally admitted fact that cattle kept in ill-ventilated underground barns, with inadequate air space, furnish favorable conditions for increased contamination. This has been our own observation in conducting examinations on herds so situated. This fact has been emphasized to the extent that some have come to the conclusion that this cause alone furnishes practically all the explanation that is necessary to account for the disease in our herds. Not so. Bad sanitary conditions can no more originate the specific poison of tuberculosis than the virus of small-pox can be developed by the same methods. Both diseases may be aggravated and the cases multiplied by such exposure, but neither disease can be so generated. It is by no means true that extensive invasion of any given herd is to be found only when the animals are kept under such conditions. Some of the very worst outbreaks we have investigated were confined to animals that had never been kept in barns. In one herd of forty-one animals, six had died during the latter half of the Summer, and ten more were found diseased by the tuberculin test. These were all slaughtered and the tubercular conditions verified by post mortem examination. This herd was at pasture and had never been kept indoors. From another herd of twenty-eight animals five died in the course of three months. The tuberculin test found nine additional cases. These had never been kept in any better quarters than an open plank barn. Here were two herds that led practically an out of door life, yet they were both rapidly dying out. The Station has made abundant observations of a similar nature in other instances. If an infected individual is brought into a herd of perfectly healthy animals, it becomes a menace to the health of that herd, no matter what the conditions are under which the cattle are kept, so long as they cohabit in an unrestricted way. Let no man flatter himself that his herd is safe in the presence of a single case of tuberculosis, no matter what the exent of acres over which they may range. True, these favorable conditions will lessen the chances of infection, but they cannot remove them. Several instances have come under our observation where badly affected animals came from the best kept breeding herds in the State.

Cases that are fairly established may be hastened rather than retarded by out door conditions when these mean exposure to all the inclemency of the unfavorable season. The protection of a comfortable barn, though not in the very best sanitary condition, may prolong life beyond the period that would be reached were the creature forced to fight for existence against storms and sudden changes of temperature.

WHAT ARE THE SYMPTOMS OF THE DISEASE?

This is one of the questions most frequently asked by the farmer. It is a difficult question to answer because of the extent of detail involved in making a full statement of the case. From what has been previously said in these pages it will be understood that almost any organ of the body may be the seat of disease. The symptoms will be correspondingly various. The pulmonary type, or that form of the disease in which the lungs are extensively affected, may be said to be the typical form. In nearly all cases where the disease is allowed to run its course, the evidence of lung affection will become apparent before death relieves the animal. This form of the disease is attended with difficult respiration, high temperature, frequent and feeble pulse, painful cough, failure of milk, emaciation, diarrhœa, and finally death. Occasionally the first symptoms may be severe lameness from tubercular deposit in the articulations. Swelling and abscesses about the throat and the udder of cows are not unfrequent manifestations. When non-vital organs are the first seat of the disease the animal may continue in a fair state of general health for months, and even years. Doubtless there are occasional cases of final permanent recovery. The disease in nearly all cases assumes a chronic type, which is misleading to the owner. But it must be accepted at once and for all, that it is impossible to detect any considerable proportion of the cases at any given time, by the most searching physical examination of the expert. If it is the fixed purpose of the owner to find the real extent of the infection in a diseased herd, he must have recourse to slaughter, or apply the tuberculin test.

RELATION OF MEAT AND MILK SUPPLY TO PUBLIC HEALTH.

That the mortality in the human family from tuberculosis exceeds the death roll from all other infectious diseases put together, is a generally admitted fact. Statistics place th death rate from this cause as high as fourteen per cent. A some of our Indian agencies, where the habit of eating uncooke meat is a general one, the mortality statistics show that fift per cent of the deaths is due to tuberculosis. It is a very dif cult matter to determine approximately how much of the mo tality from human consumption is to be attributed directly infection from the lower animals. The causes in most of th cases are so hidden in obscurity that a definite explanation impossible. But there is abundance of positive proof, and sti more collateral evidence, to show that the food supply derive from the animal kingdom is no small factor in the distributio of the disease.

There are few experimenters, who have been close obse vers of these phenomena, who cannot cite cases that point least in the direction of these conclusions.

One case came under our observation, where five youn people between the ages of twenty and thirty years died consumption from one family during a period of two years. N a trace of the disease had ever been known in the family either the father or mother of the victims. On the far where the deaths occurred we found seventeen cases of tube culosis in the herd of cattle, and others had died before th investigation was made.

Another bit of history in connection with a diseased he that was under test, is worthy of mention. A mother and chi died; the mother from undoubted consumption; the child fro intestinal trouble highly suggestive of the same disease. Th cow that had supplied milk to the mother and child was teste and found to be tuberculous. Post mortem examination of th cow revealed a badly tuberculous condition of the udde Similar observations on the part of other station workers an practicing physicians have been made so frequently that th conclusion is unavoidable that to some extent to our me supply, and in a much larger way to our milk supply can traced many of the cases of tuberculosis in the human family

HOW CAN HEALTHY HERDS BE SECURED, AND HOW CAN TH BE KEPT FREE FROM DISEASE?

This is the practical question toward which all the othe tend. It is of little consequence to know that disease exis unless that knowledge can be made to aid us in averting t evils we have found. The means by which total extermination of the disease can be accomplished do not seem to be in sight. So long as there remain cases of consumption in the human family, there remains the possibility of occasional re-infection of bovines. But the probabilities of infection from this source are remote, and should not be taken as arguments against any restrictive measures that might be adopted.

While absolute extermination of the disease at once may not be practical, we believe it to be entirely feasible to so far restrict its dangers as to render them of slight consequence. The State has already, with small expense, eradicated the disease in a considerable number of dairy herds. And what is of more value to the public at large than freeing these herds from disease, it has demonstrated the possibility and the practicability of the plan, and has done much to educate the people as to the sources of danger. The result is that many owners of herds have voluntarily, and at their own expense, had the tuberculin test applied, and the diseased animals destroyed. The work the State has done, is in this way being supplemented; and the practice of testing dairy cows is likely to have a very large increase in the future, without the aid of compulsory measures. Once the herd is free from disease, it can readily be kept in this condition by exercising due precaution in the introduction of fresh stock. Dairymen who have had unfortunate experience with the disease, have adopted the practice of admitting none but tested cows to their purified herds. This practice, if uniformly adopted, would very soon render the dairy herds of Iowa free from tuberculosis. If in addition to these precautions, similar vigilance were exercised over the introduction of breeding stock to the herds, the chief sources of infection could thus be shut off. If restrictive measures of this kind were applied to these two classes of cattle, practically all the cases of tuberculosis in the State would soon be found, and its ravages reduced to the minimum. The measures adopted in a few score of dairy herds in the State, if applied to the remainder, would go very far toward eradication. It is possible to reach most important practical results without the expenditure of large sums of money or the sacrifice of important interests.

All animals suffering from the disease in any of its stages should be at once removed from contact with other cattle. It is our judgment that any plan which contemplates keeping tuberculous animals on the farm, and attempting to avert danger by seggregation and other like precautionary methods, will defeat its own ends. The less the number of possible sources of infection in the country, the more successful will be the efforts at eradication. Buildings where tuberculous animals have been confined are to be regarded as infected, and no healthy animal should be assigned quarters in such enclosure till thoroughly disinfected.

It is true, a single test may not in every instance free the entire herd. After-infection may take place. It would be wise in those cases where a number of badly affected animals have existed, to take the precaution of applying additional tests some months after the first. All this involves care, the expenditure of a certain amount of money, and the occasional loss of an animal. But the animal already suffering from an infectious and highly fatal disease can not be considered to possess any high value. The inconvenience and expense attending such precautions are small in comparison with the loss and risk involved in allowing the disease to run its natural course in the herd, and the sale of dangerous products for human consumption.

In most cases the amount of tuberculin used has been two c. c. for animals of one thousand pounds weight. This dose has proven satisfactory, and as we believe it of decided advantage to detect every case of tuberculosis in the herd, if possible, we do not believe the use of the minute dose recommended by some, and which it is claimed may not reveal the mild cases, is advisable. Our experience with that of others goes to show that for each subsequent injection the dose should be increased above the preceding one in order to obtain a satisfactory reaction. If considerable time elapses between the injections, a reaction is more apt to follow. As a rule the first injection produces the most satisfactory results.

The normal temperature of *different* animals varies much and that the temperature of the *same* animal may vary considerably at different periods of the day. In some herds the evening (eight, nine or ten o'clock) temperature has been the maximum one secured, while in other herds the morning (eight or nine o'clock) temperature has been the highest. Our observation has been that in Summer the normal maximum temperature is reached in the evening and in the cold weather of Winter in the early forenoon.

The question of normal temperature, as has already been stated, must be carefully considered, as many things beside the injection of tuberculin may cause quite a marked change. We have not found the period of œstrum to alter, to any considerable extent, the regular temperature. In our opinion, when the animal shows an even normal temperature it can be satisfactorily tested, whether in heat, far advanced in pregnancy, or has recently calved.

When the injection is made about ten P. M.—the most convenient time, as the night work is reduced to the minimum—the eight A. M. temperature the next morning will show, in a small per cent of affected animals, a considerable rise above the normal. In a majority of cases no rise will be observed at this time. As those showing a rise reach the maximum at a later hour, there is no necessity of taking the first reading of the temperature until ten hours after injecting, unless the entire upward curve of the fever caused by the tuberculin is desired. While in a great majority of the cases the rise begins before the thirteenth hour, in rare cases the reaction is much delayed and may escape observation unless the temperature be observed, until the eighteenth or twentieth hour after injecting.

The rise, or fever, continues for several hours, reaching the maximum in a majority of cases in from fifteen to eighteen hours, after which it gradually returns to normal. Consequently, a characteristic reaction is one in which the temperature gradually rises above the normal and then gradually recedes back to normal. The degree of the rise, or reaction as it is usually termed, varies somewhat in different individuals, as has been previously stated. A majority of tuberculous animals show a maximum above one hundred and five. A few only have a temperature above one hundred and seven. The animal slightly diseased, as a rule, shows a higher temperature than one having the disease in *a severe* form. One investigator has stated that a temperature of one hundred and seven or above indicated that the lesions in that animal are microscopic. Such has not been our experience.

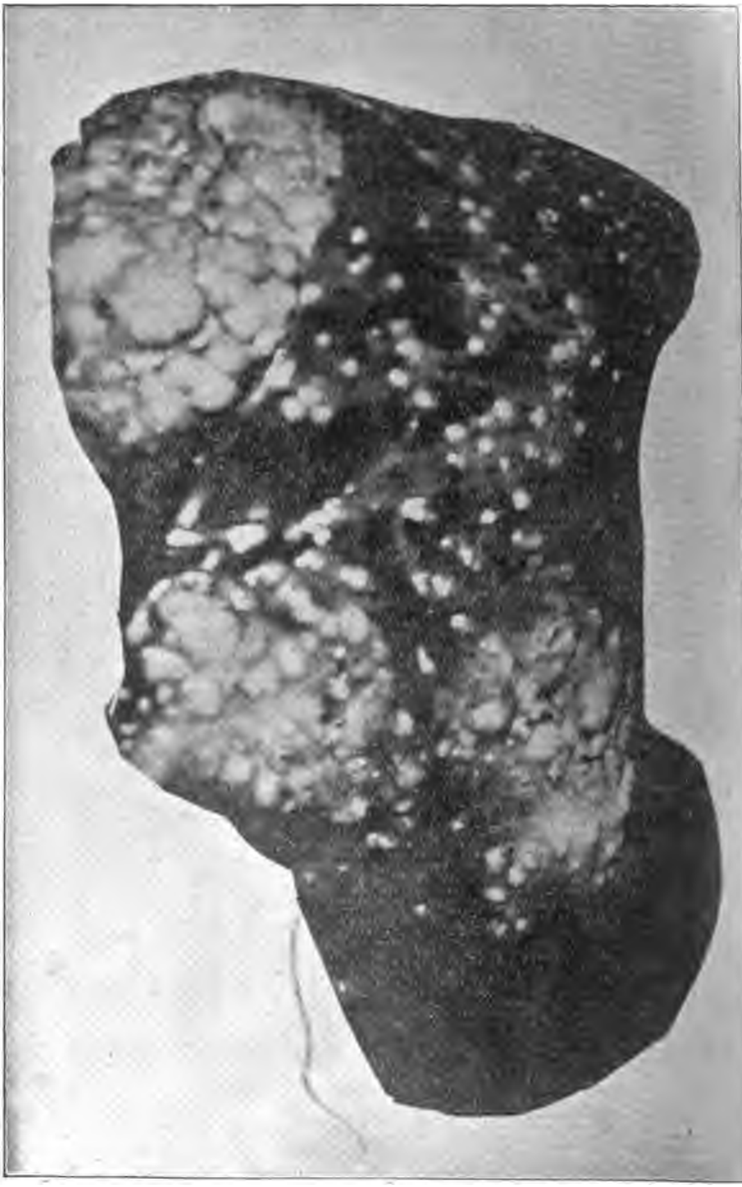
As to what should be considered a reaction is a very important question. All workers unite in saying that a rise of two degrees or over indicates tuberculosis, and probably all would say that a less rise may and does in many cases indicate the disease. Our experience and that of many others goes to show that a rise of one and a half degrees is sufficient to condemn the animal as tuberculous. In some cases it is very probable that a rise of even one degree continuing for four or five hours and occurring when the reaction should occur, indicates lesions in some part of the body. We have found, as have also others, that an animal badly diseased does not as a rule react strongly, but that a physical examination of these will reveal the disease in most instances, without which it may be overlooked.

The effect of repeated injections has been considered with a view of determining whether by making a second test a doubtful record could be cleared up, the animal proven healthy or diseased, and whether by the use of several injections a diseased animal could be cured. In some cases the reaction after the second injection was less than after the first and no appreciable rise followed the third test. In these animals the amount of tuberculin used in the second test was greater than in the first, and our experience as well as that of others, indicates that in order to secure as great a rise after the second injection as that following the first, the dose of tuberculin should be increased. With a considerable increase in dose and the elapse of several weeks between tests, we believe satisfactory results can usually be obtained by testing the doubtful cases twice.

Autopsies were held on three of the diseased animals that had received at intervals ten injections of tuberculin. Two of these were fat, apparently in the best of health, and showed only very slight lesions. It seems very probable that in these animals the tuberculin exerted, to a certain extent at least, a curative effect. More observations will have to be made along this line before anything definite can be stated.

In our autopsies a bronchial lymph gland was involved in a majority of the cases. In a number of instances this gland was much enlarged, containing a number of tubercles, in different stages of degeneration, when lesions were observed in no other region. It is a noteworthy fact that in a majority of the animals found diseased and destroyed, the disease had been chronic and the lesions very limited. Nevertheless the large number of diseased animals in herds where acute cases are absent indicates that the mild case is always a source of danger.

PLATE No. 1.



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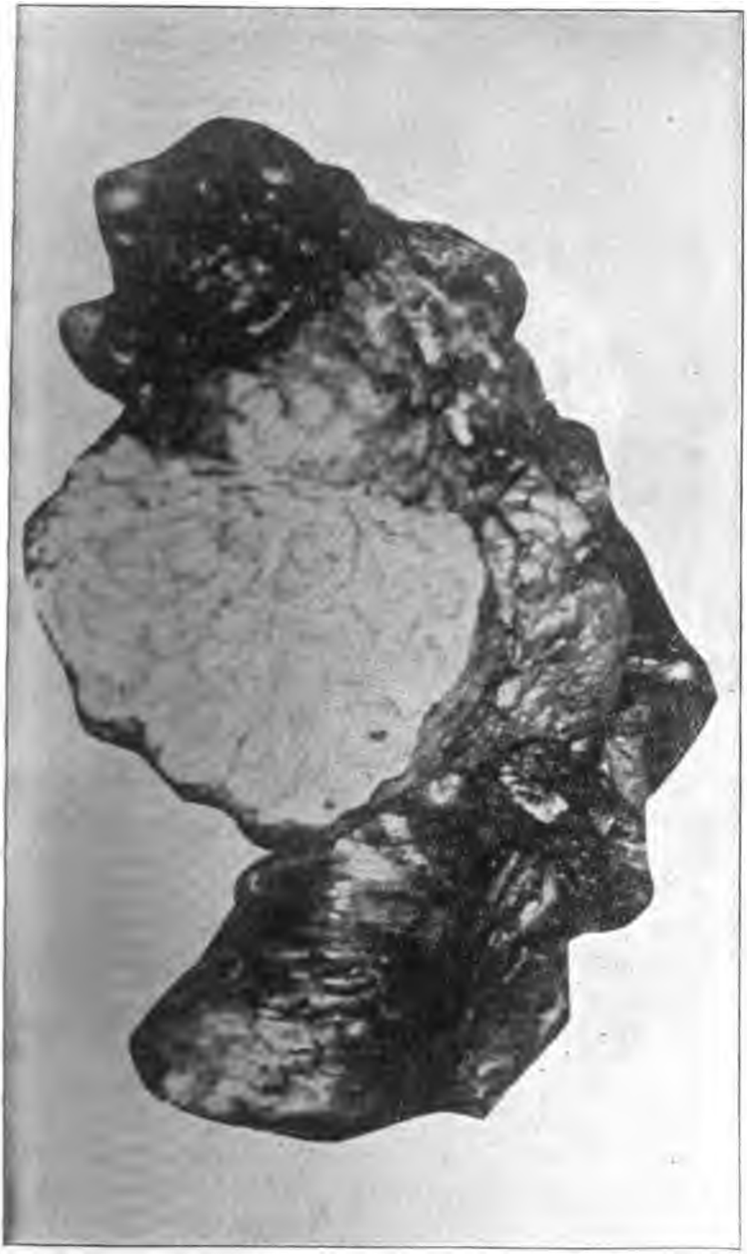


PLATE NO. 3.

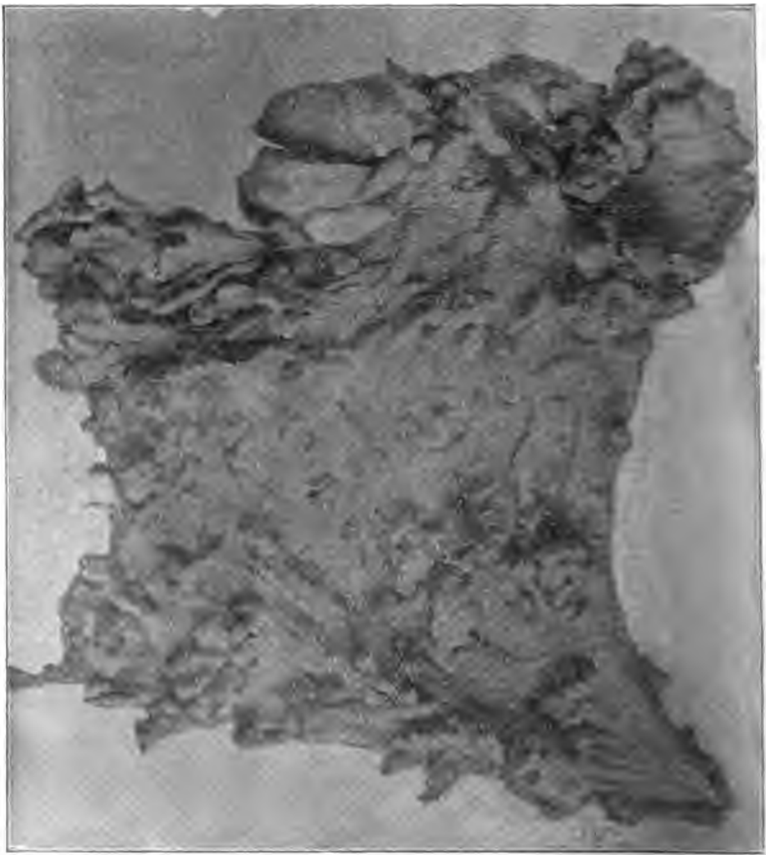


PLATE NO. 4.

DESCRIPTION OF PLATES.

PLATE 1—Grade Shorthorn cow that reacted and continu
to react to the test. While not in milk she continued in t
flesh all Summer. Autopsy revealed marked tuberculosis
liver and lungs with tubercles in other regions. A case
cured by the tuberculin, nor one in which the course of the
ease was apparently hastened by its use.

PLATE 2—Liver of animal shown in Plate No. 2. Wh
spots represent tubercular areas. Organ much enlarged.

PLATE 3—Lungs of animal shown in Plate No. 2. La
white area repres nts a section of one lobe, showing a num
of tubercular abscesses filled with a cheesy like substance fr

broken down tubercles. Other lobes of the lungs also much enlarged and filled with tubercles of various sizes.

PLATE 4—A part of the mesentery from specimen in the college museum, showing presence of tubercles scattered over the surface.

PLATE 5—A portion of the omentum from a cow covered with nodules of tuberculosis. ("Grapes.")

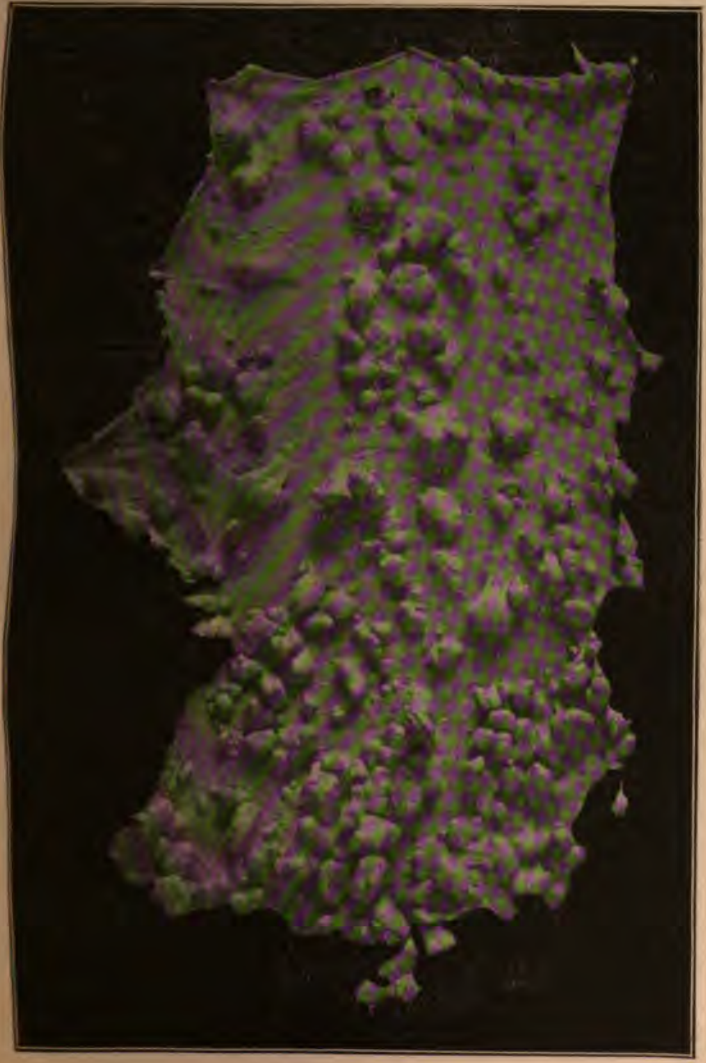


PLATE No. 5.

EFFECT OF TUBERCULIN ON HEALTHY COWS.

There exists among cattle growers an opposition to the tub
culin test because of a possible injurious effect, especia
upon dairy cows. To determine whether or not this is tru
series of experiments were made by D . James Law at t
Experiment Station at Cornell University at Ithaca, N. Y.,
1894. There was set apart for experimentation two Holst
cows and one Jersey in full flow of milk, being about six wee
after calving, and two dry farrow cows of common stock, o
pointing to a Shorthorn ancestry and the other to a Dev
Meanwhile observations on the milk of three other cows, t
Holsteins and a Jersey, in full flow of milk afforded a f
comparison between cows treated with tuberculin and oth
under similar conditions but without such treatment.

The first five cows each received in proportion to its siz
full dose of tuberculin weekly.

The tests began October 30th and closed December 13th f
lowing.

In summing up his conclusions Dr. Law says:

"There is nothing in the records of temperature that wo
indicate, either at the time of the test or later, that the tub
culin had proved in any way inimical to the general heal
Had the health been impaired by the repeated operation of
tuberculin it might have been expected that the constitutio
disturbance would have been more distinctly marked in
later tests than in the earlier ones, and as no such tendenc
observable it may be safely concluded that so far as illness
be indicated by a variation of temperature, test doses of tub
culin, in the absence of the bacillus, does not seem to prod
any such illness in the healthy animal.

It has been alleged that the repeated use of tuberculin
animals slightly tuberculous abolishes the tendency to react
under the use of this agent. If this were true it would arg
rather a curative than a malific action of the tuberculin, bu
other experiments I have found the second test, made a w
or more after the first, to produce a no less marked reacti
so that this alleged tolerance need not be taken into accoun
the cases before us."

MILK RECORD.

"The milk record may be accepted as a more sensitive
of constitutional injury than temperature, breathing or pu
It is also farther reaching than these other indications, a

involves a healthy exercise of all the bodily functions, and above all those of appetite, digestion, assimilation and secretion. An appreciable disturbance of the health at any one point will usually be manifested in this delicate balance in a variation of quantity or quality of the milk.

"Extreme variations in the yield of milk cannot be charged on the action of a test dose of tuberculin injected into a healthy animal, nor of a series of such test doses administered at intervals of a week."

PERCENTAGE OF BUTTER-FATS IN THE MILK.

"A study of the record will fail to establish any connection between the presence of a test dose of the tuberculin in the animal body and any increase or diminution of the fat in the milk. There is no change in the percentage of butter-fats sufficient to indicate any disease or ill health as the result of the administration of repeated doses of tuberculin."

EFFECT ON BODY WEIGHT.

"The weight of the animals varied so little during the experiment that it might be said to have remained stationary.

"It may be concluded that the repeated test doses of tuberculin had in no injurious way affected assimilation, and that in the two Holstein cows it had not prevented a perceptible improvement in this respect."

POST MORTEM EXAMINATIONS.

"To complete the record the two farrow cows were killed December 5, 1894, and subjected to careful necropsy. In the main the viscera were sound. The Shorthorn grade had pus in each of the left quarters of the mammary gland in the milk sinus, the walls of which were red and thickened. When stained and placed under the microscope, the pus showed numerous cocci, but no bacilli.

"As is usual in old cows, the groups of lymphatic glands in the intermaxillary and pharyngeal regions, in the chest, the abdomen, the subcutaneous and intermuscular regions were pigmented of a dark grayish color, varying at different points, but in no case showing molecular degeneration, coagulation-necrosis (casseation), nor even perceptible congestion. In the Shorthorn grade the lymphatic glands behind the diseased mammæ were considerably enlarged."

Similar tests of cattle made by Dr. E. A. de Schweinitz at the Government Experiment Station at Washington, simultaneous with Dr. Law, fully confirm the findings of the latter.

HOG CHOLERA.

The extended prevalence of hog cholera, so-called, over t State, and the immense pecuniary interest involved, sugg the adoption of all possible means for its exterminati Experience of the most careful, experienced and practi observers and investigators has demonstrated that preventi is the only safe and reliable remedy. The following has be compiled from the Fourth and Fifth Annual Reports of National Bureau of Animal Industry of experiments made the farm of the Bureau, and elsewhere:

These reports have demonstrated that hog cholera and sw plague are caused by two distinct germs, or bacilli, and t they are two different diseases. The latter is so unfreque and the tendency is so great to confound the two diseases, i intended herein to give information relative to cholera on

The two diseases may exist independently. There may cholera in a herd of swine without the plague, and *vice ve* The distinctive feature of the plague is that it affects lungs, and of cholera, that it affects the intestines, though intestines are more or less affected when the plague preva but lung lesions are rarely seen.

In either case, treatment is not recommended, for the rea that no specific, or remedy is known in veterinary or hum medicine that will cure ulcerative diseases of the large bow except time, careful dieting, rest, and palliation for pain, al which it is impossible to carry out with swine. Of the n berless advertised and alleged specifics and cures, the were tried and found of no value. The only course rec mended is that of prevention.

INDICATIONS OF THE DISEASE.

The presence of the disease is indicated by a cold shive lasting from a few moments to a few hours; frequent sneez followed by loss of appetite; rough appearance of the h drooping of the ears; stupidness; attempt to vomit; tendenc root the bedding; to lie down in dark and quiet places; dull of the eye, often dim; sometimes swelling of the head; eruption on the ears and other parts of the body; dizziness; laborious breathing; vitiated appetite for dung, dirt, and salty substances; accumulating of mucus in inner corner of the eyes; discharges from the nose; fetid and offensive odor of discharges from the bowels; offensive exhalations; diarrhœal discharges are semi-fluid, of greyish-green color, and often mixed with blood. In many cases on the skin on the belly, between the hind legs, behind the ears, and even on the nose are numerous red spots, which toward the fatal termination, turn purple. As the disease progresses, the animal becomes sluggish; the head droops with the nose near the ground, but usually the animal will be found lying down with the nose hid in the bedding. If there has been no costiveness, about two days before death there will be offensive, fetid discharges; the voice becomes faint and hoarse; the animal is stupid; emaciation increases rapidly; the skin becomes dry, hard, and very unclean; there is a cold, clammy sweat; and death soon follows with convulsions, or gradually by exhaustion, without struggle.

In chronic cases, or those of longer duration, the animal becomes weak, lies down most of the time, eats but little, and has diarrhœa. These cases may linger for a few weeks scattering the poison of the disease in the discharges, wherever they go.

APPEARANCES AFTER DEATH.

In acute cases of cholera after death, the spleen (milt) will be found enlarged and very black. Spots of blood from a pin head to one-quarter inch or more, will be found in the fat under the skin, on the intestines, lungs, heart and kidneys. On opening the large intestines they will be found covered with these dark spots of blood. Frequently the spots are covered with clotted blood.

Kill an animal in the chronic stage, open the large intestines, and there will be found circular yellowish, or dark spots, or ulcers. These ulcers may be frequently seen from the outside so soon as the bowels are opened.

In the plague the lungs are the principal seat of disease. The bowels may become involved, but there are not present the peculiar ulcers as in cholera. The rectum is usually invaded, which is seldom the case in cholera. The plague is transmitted to other animals only by contact.

CAUSE OF THE DISEASE.

Hog cholera is analagous to typhoid fever, dysentery a Asiatic cholera in man. It is the unanimous opinion that the diseases are transmitted through drinking water. It is spre by a specific germ, or bacillus, in many ways, to-wit:

Pigs purchased from infected herds, or by coming in conta with pigs from infected herds, or by running over grou occupied by diseased swine within one year previous, may, a frequently do, contract the disease. There are, frequent cases where animals of an infected herd will live several mont after the disease has apparently entirely subsided withou sign of it, when they will suddenly die.

Infected streams may communicate the disease to he below the source of infection. Experiments have shown t hog cholera germs (bacilli), will live and retain their virus f months in water. This would be ample time to infect every h having access to streams below the source of infection.

The virus may be carried in feed, implements, and on feet and clothing of persons from infected herds and premis

The cholera germs retain their vitality from two to four six months in the soil. They are not destroyed by dryi Hence, a person walking over infected ground may carry a the dried germs on his shoes and clothing to a neighbor herd. Animals feeding upon the carcass of dead cholera h will convey the disease germ wherever they go. The spr of the disease has been traced to sheep, dogs, rats, and mi the latter especially.

Pigs become infected by feeding on the discharges and ur of sick hogs, and the carcasses of dead hogs.

HOW THE DISEASE SPREADS.

Hog cholera germs have never been found in soil or wa independent of the disease. Neither have they ever been fou except in the body or discharges of diseased hogs, and f these the infection spreads.

The report of the Bureau for 1896 says of the source infection:

1. The chief carriers of the infection are the swine th selves. This disease having its chief seat in the intestine discharge of bacilli from the ulcers of chronic cases, or such have survived an attack, may take place long after the s sidence of an outbreak, or after they have changed ha

Infection may thus be carried over in the herd until a new susceptible generation of young swine appears to continue the losses. Outbreaks occurring without any traceable importation of infection from without are very probably due to latent infection in the herd itself.

2. The custom prevailing in some parts of the country of not promptly removing dead hogs, or of allowing them to be gnawed at or even partly consumed by the living is a potent cause for the perpetuation and strengthening of the infective agent. In such cases the bacilli consumed may cause mild, unrecognizable attacks, with discharge of bacilli from the bowels subsequently.

3. Preventive inoculation with living cultures may disseminate and perpetuate the disease, because the attenuated vaccinal cultures may regain their normal virulence in the body of the swine after a certain lapse of time.

4. The waves of epizootics which appear to sweep over the country at long intervals may be due to a sudden increase in virulence of the specific bacilli after they have been passed through the body of swine for some years.

5. Pathogenic bacteria are always a menace, and no pains should be spared to restrict their dissemination and multiplication in every possible way by quarantine, by disinfection and by the destruction of the dead with fire if possible.

The report cites a case where a farmer threw dead hogs over a fence and carrion birds fed on the carcasses. Within a week a fearful epidemic of the disease spread over the surrounding country. The evidence was conclusive that the germs of the disease were carried on the feet and legs of the birds.

There is a practice in some parts of the country of gathering young pigs from localities through the intervention of dealers. In regions where swine diseases are prevalent much of the time, and where the virus never dies out, this is a specially dangerous practice. While swine may not be visibly diseased, or may simply appear somewhat unthrifty, they still may carry the seeds of a violent outbreak within them, which need a little time to gain the required momentum. The mild character of the disease in any one animal is no evidence of the character of the germ. For this mildness may be due to a very virulent germ acting upon a highly insusceptible animal and causing a more prolonged chronic disease. In fact, these partly insusceptible animals are the most likely to appear the markets because they are the remnants of herds destro by the disease.

HOW TO PREVENT THE DISEASE.

1. So soon as a herd becomes infected, the healthy anim should be immediately removed from the sick so far av there will be no danger from infection by contact, drainage the soil, water, or gusts of wind. They should be given am space so that if there are diseased animals among them it not spread so rapidly as when they are crowded. The bod of those removed may be disinfected by pouring over the two per cent solution of carbolic acid, or two and one-h ounces of acid to one gallon of water, and also driving th through the solution to disinfect their feet.

2. Destroy all diseased animals. As there is no relia means of treatment or cure, destruction is the simplest most economical in the end. A single diseased animal will s infect a herd.

3. Each dead body should be buried so deep no animal get at it. It should be covered with a layer of slacked l several inches thick. If burned, care should be taken parts not burned are buried as above. The sale and carry of such dead bodies to rendering establishments, a most pro means of spreading the disease, should be prohibited by la

4. There should be frequent and thorough disinfectio the premises, and cleanliness maintained. Slacked lime good disinfectant for hog cholera, using one pound of lime gallon of water. It may be used as a whitewash on fences pens, and spread over the soil in a thin layer, and thrown pools, hog-washes, or wherever water stagnates. A m efficient disinfectant is crude carbolic acid, costing about dollar per gallon, and an equal quantity of sulphuric acid. two acids should be carefully mixed in a glass jar or bottle, poured slowly into water in a wooden pail, in proportion of ounces of the acid mixture to one gallon of water. This sh be used with a broom or brush upon woodwork, fences, p floors, tools, etc., and also dashed over the soil. For shoes boots, brush them with a mixture of one-fourth ounce of bolic acid and one-half gallon of water. Pails, after use, sh be rinsed with water to prevent the acid from destroying iron hoops.

5. All manure from sick hogs should be disinfected be removal.

6. After a disinfection of the premises, no hogs should be allowed thereon for at least four months. Where a few animals are left, that have been exposed, no fresh animals should be added to them for six months. If it is necessary to put fresh animals where the disease had been, as in stock yards, etc., then all prior infected animals should be killed, and the premises thoroughly disinfected as stated.

7. Sick hogs should not be permitted to stray into out-of-the-way places, under buildings, and into fence corners, or under straw stacks, thus scattering the disease, and rendering disinfection impossible. They should be penned or closed in a yard where proper attention can be given them, and other hogs kept from them.

8. Where no disinfection is had, hogs should not be admitted on premises where the disease has prevailed within one year. It is believed that the cholera germs will lose their vitality entirely in one year.

9. All domestic animals, especially sheep, that have been in contact with diseased hogs, should be enclosed away from other animals, and closely watched.

10. No person from a farm or premises where hog cholera does exist or has existed, should be permitted to come on premises where the disease does not exist, unless previous disinfection of his boots and clothing is had.

11. All birds, wild or tame, should be excluded from infected premises.

After all this trouble, there still remains the danger of a fresh introduction of the disease. It is difficult for one farmer to protect himself, when constantly menaced by his neighbors. Still, it is much easier to keep it away than to eradicate it. It is best, therefore, in those regions where the disease is always more or less present, to keep the hogs in more limited space, and enclosures of such form and size that disinfection may be had with less labor and more definite results.

It is confidently believed if these rules be faithfully observed wherever the disease exists, hog cholera can be permanently eradicated from the State.

Though Winter freezing will not destroy the germs, there is good reason to believe they will not survive more than a year in any soil. But it is carried and distributed, throughout the year, from places where cases have occurred, and thus the virus is kept alive. Hence the necessity for extensive concerted action among farmers.

TRICHINOSIS.

The 12th December, 1895, Dr. W. H. Goodenow, of Goodell, Hancock county, reported that he had five patients, whom he believed had been poisoned by eating uncooked salt pork. Portions of the meat were procured and when placed under the microscope, the characteristic encysted parasite, trichina, was found in large numbers. A sample of the meat was sent to the Bureau of Animal Industry at Washington and the following response was received:

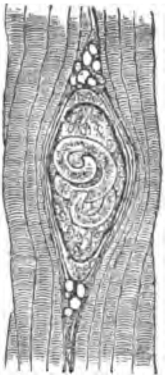
UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF ANIMAL INDUSTRY,
WASHINGTON, D. C., December 23, 1895.

DEAR DOCTOR—The specimens with your letter of December 19th were received to-day, and have been examined. We concur in the diagnosis of trichinæ, and are of the opinion that the infection of the pork is a comparatively recent one. I have already written to Dr. Goodenow for details concerning the hog. Respectfully yours,

D E. SALMON,
Chief of Bureau.

After a long and painful illness the sick recovered.

The lesson taught by this outbreak is that eating of animal flesh whether fresh or "cured," without cooking, is dangerous; and it needs repeating often.



Portion of human muscle enclosing a single capsuled trichinæ. Highly magnified. By Leuckart.

The trichinæ are readily distinguished into male and female. The sexually mature male measures 1/18 of an inch in length, and the female 1/8 of an inch. As found in the pork, when used as meat, they are always in what is called the encysted form. In the sexually mature state they are found in the intestines or in the discharges therefrom. When trichinous pork is taken into the stomach, the conditions being favorable, the little coiled or encysted worms, which were dormant, and if not taken into the stomach would have forever remained dormant, become vitalized, and by the eggs they secrete rapidly multiply, many thousands originating from one parasite. In two days the little larvæ coiled up in the muscles of the uncooked meat eaten, become sexually mature and active; in six days the little embryos are born, a numerous and restless progeny. Those that are not thrown off by the intestinal discharges of the patient, begin migrating. They pierce through the coats of the stomach, and while they seem to have a special affinity for for some muscles they may be found in more or less numbers in all muscular tissue except that of the heart. As soon as the trichina reaches the end of its journey, be it long or short, so it reaches a proper muscle of the body, it coils itself up and becomes encysted. After they are once encysted, provided by their wanderings they have not killed the patient, they may be carried about during a long lifetime without any special inconvenience. It takes about two weeks for them to become encysted. When thus dormant they are surrounded by a capsule or sheath. During the migratory period the patient suffers intensely.

All authorities agree that a moist heat of one hundred and seventy degrees Fah. will effectually kill the parasite. Some say that one hundred and fifty degrees Fah. is amply sufficient. A ham if boiled for an hour would be rendered safe. Dr. Lewis, after a number of interesting experiments, ascertained that the center of a leg of mutton in five minutes after boiling began acquired a temperature of one hundred and seven degrees Fah.; so it would be safe to assert that a ham boiled for an hour would, if trichinous, have all the parasites destroyed and could be eaten with impunity. Don't eat *raw* meat, especially pork. Better have all meats well and thoroughly cooked.

CIGARETTES.

The crusade against the cigarette, which was begun six years ago, is slowly but surely progressing. The increase in the manufacture is enormous. The following statement shows the sale of cigarettes and cigars in the United States since 1868.

	CIGARETTES.	CIGARS.
869	1,566,993	999,535,934
870	13,708,833	1,139,420,774
1871	18,871,013	1,313,913,604
1872	20,678,000	1,507,014,922

	CIGARETTES.	CIGARS.
1873	27,080,500	1,779,946,596
1874	28,541,500	1,857,979,298
1875	41,297,883	1,419,586,568
1876	77,420,586	1,828,807,396
1877	148,846,257	1,799,412,920
1878	165,189,594	1,904,825,887
1879	238,276,817	2,019,234,470
1880	408,701,366	2,367,803,248
1881	567,386,983	2,682,620,797
1882	554,045,886	3,040,975,395
1883	739,902,503	2,403,849,392
1884	907,945,140	3,454,969,610
1885	1,058,650,280	3,358,849,433
1886	1,310,925,800	3,500,862,293
1887	1,584,494,400	3,788,305,443
1888	1,862,726,100	3,844,726,650
1889	2,151,486,160	3,867,385,640
1890	2,233,254,680	4,087,889,983
1891	2,684,538,760	4,474,892,767
1892	2,892,982,840	4,548,799,417
1893	3,176,693,700	4,814,197,117
1894	3,181,574,760	4,066,917,433
1895	3,786,624,057	4,127,607,527
1896	4,668,020,352	4,237,755,943

While the increase in the number of cigars sold in 1896 over the number sold in 1895 was only 74,197,107, the increase in the consumption of cigarettes was 881,396,295.

It is estimated that ninety-seven per cent of cigarettes sold in the United States, are made by the tobacco trust monopoly known as the American Tobacco Company, with a capital of thirty-five million dollars, and with its profits over three million dollars a year, it has secured control of the business.

In the United States, cigarettes are principally made by machines which turn out two hundred and seventy-five a minute. Each manufacturer, who is a member of the trust uses a different combination of tobacco, the preparation of which is a close secret. A mixture of various essential oils and drugs, among which are said to be opium, valerian and canabis indica, so that each different kind creates a special drug habit, to which smokers confine themselves exclusively. The paper used for wrapping is made in France and, it is claimed, is made from rice. Chemistry shows it also contains arsenic.

The deleterious effect of cigarette smoking, especially upon youth, has aroused public sentiment to an effort to abolish the noxious article. Recent investigation among the public schools of Chicago disclosed cigarette smoking to an alarming extent among the pupils. The teachers and parents, while familiar with the result upon the children, were astonished at the large number addicted to the habit. The mothers became aroused, public meetings were held by the various women's clubs to devise measures to stop the demoralization of the schools. Mrs. Mary D. Olson, principal of the McCash school, stated at one of the meetings that the vice had increased to such an extent in three years in the schools, that nearly three thousand boys had been found who smoked cigarettes. She said:

> Some pupils are so affected mentally and physically that they can make no progress in their studies. The boys tell it themselves, and half of the principals know it. Some of these boys smoke from two to twenty cigarettes a day, and not more than ten boys out of one hundred and twenty-five whom I have observed while under my charge could keep pace with their class. Yet nine-tenths of them belong to educated and intelligent families. Among these one hundred and twenty-five boys were found nearly all of those pupils who were from two to five years older than the average age of children for the grade. All were in the habit of playing truant.
>
> From frank and friendly talks with twenty-five of these boys, all confessed that they were too sleepy to study; thirty of them said they were dizzy after smoking, twenty-two could not write neatly because their hands trembled, several said they felt shaky when they walked. A large number were unable to run any distance, not more than half a block, yet before they began to smoke they were as quick and lively as their fellows. After careful investigation of the cases of ten boys who were from four to five years too old for their grades, I found that each one began going to school about the age of six and had made a grade or more a year up to the time he began smoking, when all progress stopped. Several of these boys had even dropped back a grade or two. A number who had joined an anti-tobacco society succeeded in breaking off the habit entirely, and all expressed themselves as feeling like different beings. Those of them who had been the poorest in their class became the best.
>
> These boys told me they never spent a cent for candy or fruit; every penny went for cigarettes. Some even filched cent pieces from the change given them after a purchase at the grocery or butcher shop. And yet all these boys told me they had never taken money for any other purpose than the buying of cigarettes. I will add that I believe them.
>
> Wishing to obtain the consensus of opinion of the principals, both as to the prevalence of the habit and its disastrous effects, knowing that many of them had given the matter their attention, I sent a circular letter to every school in the city, asking the following questions: First, the number of cigarette smokers in each school; second, the number of those up to or above the average in scholarship; third, the time usually required by a smoker to do a year's work; fourth, the effect of the habit on the memory, mind, morals and health.
>
> In answer I received replies from one hundred and fourteen schools. Twenty of these were unable to determine the number of pupils addicted

to the habit; of ninety-four making reports, six schools stated they had no cigarette smokers, having abolished the habit through anti-tobacco societies. From the eighty-eight remaining schools four hundred occasional smokers and two thousand four hundred and two addicted to the habit were reported, with only two hundred and sixty-six, or eleven per cent, able to do the work of the class. Omitting the report of three schools which gave a total of four hundred and three smokers, with one hundred and fifty up to grade, only six per cent, or one boy in sixteen, was able to do the work of his grade. As there are two hundred and thirty-five schools in Chicago, including high schools, and as ninety-four of these report two thousand four hundred cigarette smokers, it is safe to say that making a conservative estimate, there are five thousand cigarette smokers in our city schools, not more than four hundred of whom are able to do good work. All the principals were agreed that the effect on pupils in the first grade was more disastrous than on others in higher grades. Sixty-seven grammar schools reported a total of forty-six cigarette smokers who had graduated within the last two years, or an average of only one smoker to three schools who had graduated within a year. There are few cigarette smokers in the seventh or eighth grade, for the obvious reason that they never reach those grades. The effect on high school boys is equally disastrous.

Mrs. C. M. Towles, of the Garfield school, and Vice-President of the Teachers' Club, said:

It is almost impossible, unless one devotes himself especially to the investigation of the fearful enormity of the cigarette habit among school children, to appreciate to what extent it has grown. At the very lowest estimate between two thousand and three thousand children now attending schools in this city are slaves to the baleful little-paper cigar. In almost every instance these children are defective in hearing and seeing. They are listless and nervous and range in age from seven to fourteen years. They can't keep up their work, and in fact cannot keep still while at their desks. I have boys in my school who are in the fifth grade who can hardly see. They are careless, and pay no attention to their instructions. In a moral sense, also, the effect of smoking cigarettes is bad. Confirmed smokers will lie and steal. One little fellow in my school stole the contribution box of pennies contributed for the benefit of the Children's Aid Society. With the purloined pennies he purchased cigarettes.

Miss Wentworth, of Farragut school, said:

I have two boys in my school, both thirteen years of age, who are apparently confirmed slaves to the cigarette habit. One of these is in the third grade, when in reality the child should be on the eve of graduation. At least he should be in the eighth grade.

This is a fearful record. It so aroused public sentiment that the city council, by ordinance, provided for a heavy license to regulate the traffic, with severe penalties for selling or giving away to minors, and the whole business was put under police surveillance.

Nor is Chicago, with a sale of fifty million cigarettes per year, alone in this regard. The Boston *Globe* gives the following:

> The cigarette, though small, has a very large story connected with it. It is smoked by the old and the young, by the rich and the poor, at home and abroad, after lunch, between acts at the theater, in all countries and by all races.
>
> A very odd thing about cigarettes is that the brand used in the East does not appear in the West; those sold in the North do not sell in the South.
>
> Many brands of tobacco-covered cigarettes are made, but they do not find a very ready market, the paper-covered cigarette being the favorite.
>
> Most of the cigarettes sold in this section of the country are made of domestic tobacco, although a large quantity of high-priced Turkish tobacco is being used by those who can afford the luxury.
>
> One of the largest dealers in Boston sells one million each week; there are three more that sell five hundred thousand each, five that dispose of one hundred thousand each, and two that sell two hundred and fifty thousand per week. This makes a grand total of three millions five hundred thousand sold each week by these eleven dealers.
>
> Naturally not all of these are sold in Boston, but the greater part of them are sold in towns close by and are undoubtedly smoked by people who are employed in the city.
>
> This would make every year the sum sold reach one hundred and eighty-two millions, which would give every individual in the city of Boston one cigarette each day in the year and still have a reserve fund.
>
> The North End exceeds all other sections in the city in smoking cigarettes. On Salem street there are three manufacturers who sell direct to the consumer. Two use domestic tobacco and make about forty thousand each per month. The other sells about twenty-five thousand each month and sells tobacco (Turkish) and paper to the consumer direct; the cigarette is rolled by the smoker himself. He sells each week five boxes of books, each box containing seven thousand two hundred papers. This would make three million two hundred and twelve thousand sold on Salem street.
>
> The Turks and Armenians and some of the Poles are experts in rolling cigarettes, and they smoke only those rolled by themselves. The fourteen dealers quoted dispose of one hundred and eighty-five million two hundred and twelve thousand cigarettes a year.
>
> The largest factories in the world are in this country and are nearly all owned by one company, who made three hundred and six million last year.
>
> Although a great many cigarettes are imported into this country, there are many more exported.

A New York oculist reports that a disease of the eye had appeared which, after careful investigation, was found to be confined to smokers of cigarettes. The symptoms were dimness of vision and an intermittent film-like formation over the eye, obstructing vision and requiring long treatment for a cure. It is known among oculists as the "cigarette eye."

State Boards of Health have been actively engaged in po ing out the dangers of the habit and in efforts to secure rest tive, if not prohibitive, legislation against it.

At the August (1896) meeting of the Iowa Board Dr. Emm of the Board, presented the following paper, which was n cordially accepted:

"It is the duty of the State Board of Health in every way possible to to educate the people in sanitation, including any practice that may l the vital standard and degrade or demoralize the individual. Belie matters of this kind should at least be agitated by this Board I desi present a few thoughts as well as a resolution upon one of the most dan ous, degrading and growing habits of the present day; that of ciga smoking. If my information is correct, it is often made from the stu and partly smoked cheap cigars collected from the streets, alleys, dens slums of large cities, by persons who are as filthy as the degraded and eased creatures who throw them away.

"After a cigar is partly smoked and allowed to lay some time it un goes some kind of a change, chemical or otherwise, that will produce na in the oldest smoker, showing this change has a powerful effect upo nervous system, and must be detrimental to health. If this was all it w not be so bad, but at least seventy-five per cent of the manufactured c ettes upon the market are impregnated with opium, arsenic, cocaine or other enslaving drug. This is not smoked like a cigar, but the smo drawn into the lungs, where the poison is deposited upon the sensitive delicate mucous membrane of the lungs. The anatomical structur physical action of this membrane is such that the poison enters directl the arterial circulation, exerting almost immediately its action upon an all of the organs. But the chemical history demonstrates its peculiar ity for the nervous system. What makes this habit more dangerous being the boys' and young men's cigar.

"The adolescent, we know, are much more susceptible to any ki poison, and their effects are more injurious, permanent, and more liab interfere with normal function. The poison, whatever it is, I repeat peculiar affinity for the nerve centers. We find boys addicted to this —some become unreliable, dishonest, untruthful, in fact a general low of the moral tone. The skin takes on a peculiar yellowish-blue resembling very much the cachectic appearance of malignancy. He mal-digestion and mal-nutrition. His mental perceptions are blunte his capacity for study or learning is reduced. Consequently he falls b in his classes and soon drops out of school, to become a street loaf criminal, and consequently a menace or burden upon society and the S

"These are briefly some of the effects and dangers of cigarette smo I believe the laity are unconscious of the dangers of this growing evil that it is the duty of this Board, so far as it is in their power to do enlighten them."

He presented the following resolution, which was un mously adopted:

"*Resolved*, By the State Board of Health, that in its judgment the of smoking cigarettes should be condemned because it is deleterio health by producing nervous disease, lowering the moral tone, and checking the mental, moral and physical development, especially in the young."

In several States laws have already been enacted prohibiting the sale of cigarettes to minors, but they have proved unsatisfactory, in that they were constantly evaded by the purchase by adults who supplied them to minors, and there was no definite means for enforcement of the statute. The latest and most efficient means of controlling the traffic is by a system of taxation, which is embodied in the acts of the last legislature, and which take effect the first day of October, 1897, and which are as follows:

SEC. 5. No person shall directly or indirectly, by himself or agent, sell, barter, or give to any minor under sixteen years of age, any cigar, cigarette, or tobacco in any form whatever, except upon the written order of his parent or guardian. Any violation of this section shall be punished by a fine of not less than five nor more than one hundred dollars, and the offender shall stand committed until fine and costs of prosecution are paid.

SEC. 7. No one, by himself, clerk, servant, employé, or agent, shall, for himself or any person else, directly or indirectly, or upon any pretense, or by any device, manufacture, sell. exchange, barter, dispense, give in the consideration of the purchase of any property, of any services, or in evasion hereof, or keep for sale any cigarettes, or cigarette paper, or cigarette wrappers, or any paper made or prepared for the purpose of making cigarettes, or for the purpose of being filled with tobacco for smoking; or own, or keep, or be in any way concerned, engaged or employed, in owning or keeping any such cigarettes or cigarette paper, or wrappers with intent to violate any provision of this section; or authorize or permit the same to be done; whoever is found guilty of violating any of the provisions of this section for the first offense shall pay a fine of not less than twenty-five dollars nor more than fifty dollars and costs of prosecution, and stand committed to the county jail until such fine and costs are paid; for the second and each subsequent offense he shall pay, upon conviction thereof, a fine of not less than one hundred dollars nor more than five hundred dollars and the costs of prosecution, or be imprisoned in the county jail not to exceed six months; provided, that the provisions hereof shall not apply to the sales of jobbers doing an inter-state business with customers outside the State.

SEC. 8. There shall be assessed a tax of three hundred dollars per annum against every person, partnership, or corporation, and upon the real property and the owner thereof, within or whereon any cigarettes, cigarette paper or cigarette wrappers, or any paper made or prepared for use in making cigarettes or for the purpose of being filled with tobacco for smoking, are sold, or given away, or kept with intent to be sold, bartered or given away under any pretext whatever. Such tax shall be in addition to all other taxes and penalties, shall be assessed, collected and distributed in the same manner as the mulct liquor tax, and shall be a perpetual lien upon all property, both personal and real, used in connection with the business; and the payment of such tax shall not be a bar to prosecu under any law prohibiting the manufacturing of cigarettes or cigar paper, or selling, bartering or giving away the same. But the provis of this section shall not apply to the sales by jobbers and wholesaler doing an inter-state business with customers outside the State.

WATER.

As pure and wholesome water is one of the most import essentials of life so is the prevention of the contamination pollution of water intended for domestic use one of the m important questions before sanitarians of to-day.

It is admitted that pure water is essential to the health people. How and where shall it be obtained? Nature covered nearly two-thirds of the surface of the earth v water. She has also filled the earth with water. Man polluted it. In cities and towns the soil becomes filled v filth; cesspools and vaults—abominations which should no tolerated—are made the environment of homes, and the w become polluted. Increasing demand culminates in public wa works, and rivers and lakes are selected to furnish a wa supply. Into these, however, are carried vast quantities of fil substances—the wastes of communities along their bord Nature does much to change these into harmless compounds filtration, sedimentation, aëration and oxidation, but there limit to this. The soil becomes saturated and the river lake overburdened with impurities.

The remedy is:

1. Stop the pollution.
2. Get a new and purer supply.

SOURCES OF WATER SUPPLY.

The sources of water are:

1. Cisterns.
2. Wells.
3. Springs.
4. Lakes.
5. Rivers.

These are all subject to pollution, and constant vigilanc required to prevent them from becoming dangerous to the p lic health.

POLLUTION FROM PERCOLATION.

The pollution of wells affects the larger portion of the people because of their more general use. These may be contaminated in two ways:

1. The surface water from rain, house-slops, and barnyard may find its way into the well at or near the surface.
2. The ground-water stream supplying the well may encounter drainage from privies, cesspools and barnyards a long distance away and disease germs thus be conveyed therein. The danger of typhoid bacteria entering the water should always be considered. They may be washed in from cesspools, through fissures in the earth or by passages dug by rats. Beside typhoid bacteria other organisms, which cause many severe troubles of the digestive organs, may be carried into the well.

To prevent to the greatest extent possible the contamination of the well, says *Farmer's Bulletin* No. 43, United States Department of Agriculture: "The surface of the ground about the well should be kept free from manure, slops, and other waste water; hence the well should not be dug under or close by the house, nor should it be located in the barnyard, where the ground is usually saturated with manure. It should be surrounded by turf, and not by richly manured, cultivated, or irrigated soil. The ground immediately around it should slope gently away from it and be paved if possible. The waste water from the well should not be allowed to soak into the ground, but should be collected in water-tight receptacles or else conducted at least twenty-five feet away in open or closed channels which are water-tight.

CONSTRUCTION OF WELLS.

"The well itself must be so constructed that impurities can not get into it from above or from the sides. If water can soak into it after passing through a few feet of soil only, it can not be regarded as secure from pollution. To prevent this, the well may be provided with a water-tight wall built of hard-burned brick and cement down to the water level. The outside surface of this wall should be covered with a thin layer of cement, and clay pounded and puddled in around it. Or, tile may be used to line the well and the joints made water-tight with cement down to the water level.

"These different devices are all designed to keep water near the surface of the soil from percolating into the well. To keep impurities from entering the well directly from the top c siderable care is necessary. Such impurities are likely prove the most dangerous because there is no earth filte hold them back and destroy them before they can reach water. Adequate protection above may be provided in seve ways. The sides of the tiled wells should project above surface and be securely covered with a water-tight lid. ordinary well should also have its sides project above the face and a water-tight cover of heavy planks provided, wh should not be disturbed excepting for repairing or cleans the well. Under no circumstances should objects be let do into the well to cool. A still better method of protecting water from above is to have the lining wall of the well three feet below the surface of the ground and to be top there with a vaulted roof, closed in the center with a rem able iron or stone plate. The top should be covered twelve inches of clay or loam; above this there should be a la of sand, and lastly a pavement sloping away in all directi

"Too much care can not be bestowed upon the househ well. It should be guarded jealously and all means applie put the water above any suspicion of being impure. Thi especially true in dairies where well water is used in clea the milk cans, and where steam and boiling water have not found their way for this end. Polluted wells in such ho not only endanger the health of the inmates but that of a or less numerous body of city customers."

It is an easy matter, by surface or sub-surface irrigation dispose of the slop-water, soapsuds from washing, cham slops, urine and other fouled water, and all the refuse waste from the house, so as to prevent contamination of well, especially where there is a garden, lawn, trellis, trees or orchard. The slop-water should be collected e day, in a tight tank, and conveyed to the garden or yard used for watering plants, shrubbery, trees or vegetables, may be discharged into absorption drains laid under groun having nea house a ho or recei (Fig. 1) of w or rustless i provided wi strainer and tight cover. From this a pipe may be ca underground to absorption tiles laid with open joints.

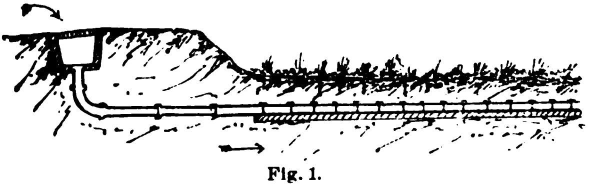


Fig. 1.

house sewage may be discharged into the hopper from a pail with slop-water, thus sending a full volume of slops at proper intervals into the soil. The principal importance is that the sewage be applied to the soil while fresh and before decomposition begins; that it be applied on or near the surface, within reach of the oxidizing influence of the air and of the bacteria of the soil; that it be made at intervals to give the soil opportunity to respire, as it were, and permit the finer particles to be oxidized and destroyed.

Respecting this system Wm. Paul Gerhard, the well-known sanitary engineer, in his "Disposal of Household Waste," says:

> The system is based upon the well known fact that the aërated layers of soil *next to the surface*, the sub-surface as it were, possess in a high degree the power of destroying organic substances buried in them, by nitrification and oxidation, aided during a part of the year by vegetation, and assisted at all times by minute organisms or bacteria. The latter play an important part in the round of changes in nature. "They are," says Tyndall, "by no means purely useless or purely mischievous in the economy of nature. They are only noxious when out of their proper place. *They exercise a useful and valuable function as the burners and consumers of dead matter, animal and vegetable*, reducing such matter with a rapidity otherwise unattainable to innocent carbonic acid and water. Furthermore, they are not all alike, and it is only restricted classes of them that are really dangerous to man. One difference in their habits is worthy of special reference here. Air, or rather the oxygen of the air, which is absolutely necessary to the support of the bacteria of putrefaction, is, according to Pasteur, absolutely deadly to the vibrios which provoke butyric acid fermentation."
>
> I lay particular stress upon the importance of distributing the sewage close to the surface of the soil, at depth not exceeding ten or twelve inches. Aëration is a *conditio sine qua non* of the whole system. At greater depths oxidation and purification become very much slower until they cease altogether. The *sub-soil* is not able to effect a complete purification of sewage, as the oxidizing influence of the atmosphere does not so freely reach it. It is the layer of earth next to the surface, the *sub-surface*, which acts on the sewage. Hence the name of the system is derived, and it is an error committed quite frequently, and to which I have more than once called attention, to call the system "sub-soil" irrigation.
>
> We see, then, that only where sewage is distributed close to the surface, where sufficient oxygen attaches to the particles of the soil, are the organic matters in it taken up as nourishment by the roots of plants, and reduced or destroyed by the bacteria in the soil. The liquid sewage, freed of its coarser impurities, soaks away into the porous ground, and thus becomes still more clarified by filtration, so that when removed by deep underdrains, it is generally found to be quite clear, colorless, free of taste or smell. By arranging an *intermittent* discharge, the upper layers of the soil are enabled to take up oxygen during intervals between discharges, and to prepare for the next volume of sewage, while the ground is prevented from becoming saturated, wet and swampy.

By this method the household waste is carried away from the well, and the contamination of it avoided. It is, of course, assumed that the general topography of the premises is favorable to such a system.

A more extended and elaborate system is that of sub-surface irrigation, by which the household waste is distributed over a large area. It consists of a water-tight tank, which may be emptied by hand, or automatically by a siphon, ball float, or other device, as in Fig. 2. Tiles are laid, at a fall of about two or three inches per one hundred feet, to a small sewage farm, some distance away—not less than one hundred feet, from a well where the sewage may flow in shallow trenches. Fig. 2 illustrates a more complex system of underground tiling in branches. To avoid overloading the soil with sewage at any one place the main distributing trench should be so arranged that it and the irrigating trenches branching from it may be temporarily blocked at any point to divert the sewage into one or more different trenches every day. In Winter the warmth of the sewage will keep it in motion and the filtration will go on although the field may be covered with snow and ice. The use of the flush tank as described above would cause a more uniform distribution of the fluid over the field and make the filtration distinctly intermittent. The ground between the trenches may be cultivated to increase the amount of evaporation. If conveniently situated, an orchard may be used as the irrigation field. It should be distinctly understood, however, that marketable fruits and vegetables should not be carelessly allowed to come in contact with fresh sewage, nor should the irrigation field be near the well unless the latter is fairly deep and tubed or tiled to the surface of the water.

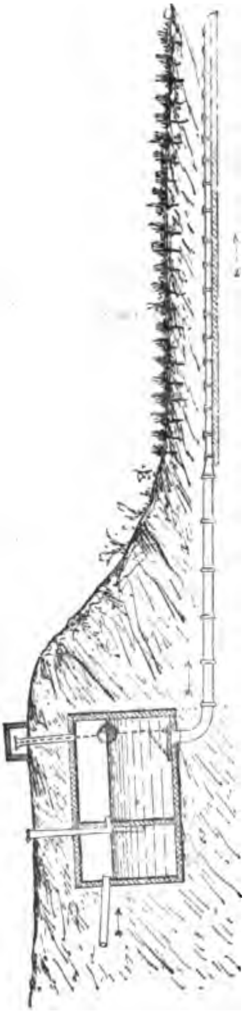


Fig. 2.

POLLUTION OF RIVERS.

Aside from wells, rivers and streams are the next greatest source of water supply, and as a rule they are the carriers of the sewage and effete products of cities and towns. They swarm with germs or bacteria, a glassfull often containing millions of them. Fortunately all of them are not harmful—in fact most of them are true scavengers. There are but very few pathogenic, or disease-producing bacteria. Dr. Sternberg names sixteen, while Professor Frankland names twenty-three. Most of these are rarely found in the streams or waters of this State. It may be safely said there is but one—the typhoid bacillus, which is unquestionably water borne. Hence it may be laid down as a rule that the mortality rate of any community from typhoid fever is a true indication, or measure, of the purity of the water supply. This is more fully set forth on page 145 *et seq.*

The typhoid bacillus comes from sewage. Its vitality is surprising. It is not killed by freezing. Hence, in connection with public water supplies it becomes a subject of great importance.

The question arises here: "Can a river once polluted, ever be a safe source of supply below the point of pollution?"

Upon this question Dr. Geo. M. Kober, Medical Sanitary Inspector for the District of Columbia, says, in his report to the commissioners of the District, December, 1895:

> The question of self-purification of rivers has been earnestly studied, and the conclusion has been reached that a certain degree of purification is possible by natural means, viz:
>
> 1. Dilution of the sewage with clean or unpolluted water which empties into the stream along its course.
> 2. By deposition of the suspended matter carrying with it some of the organic material.
> 3. By the agency of fish, water plants, algæ and infusoria, which require organic matter for their food.
> 4. By the bacteria of nitrification which are so largely instrumental in the process of oxidation of organic matter; it has been shown that the mere presence of oxygen in water without these bacteria does not lead to a perceptible diminution of organic matter.
> 5. The rapidity of oxidation is influenced by the volume of organic matter present, the temperature of the water, the distance of the run, also whether the stream has a wide surface exposed to the sun and air, the rapidity of the current and the character of the river bed.
>
> The various factors named are calculated to purify the water in our river, provided we give it a chance, but with increasing settlements it is possible that practically here, as elsewhere, the pollution becomes continuous from its source to the reservoirs. The statement of Dr. Tidy and

other chemists who declare that even a flow of even ten or twelve miles i sufficient to free a river of all trace of sewage contamination is no longe credited, especially since the Massachusetts State Board of Health for 187 reports an outbreak of typhoid fever in a hospital using river water, whic was traced to an infected barrack twenty-five miles up the stream.

As we can hardly believe that pollution is tolerated in close proximit to the "intake" of our river water, I submit that the almost constan presence of fæcal bacteria is evidence of some distant source of pollutior and that they have not been destroyed by the agencies which are believe to be all sufficient by the advocates of the theory of "self-purification streams."

It is the consensus of opinion of those best qualified to judge, that whil a stream under favorable conditions undergoes a certain degree of sel purification, we cannot rest satisfied that dangerous contamination doe not exist, and such water is unsafe for drinking purposes unless it has bee sujected to filtration by means of filtering beds. The effects of a pur water supply upon the decrease of typhoid fever has been abundantly demonstrated in various cities, and the very fact that filtering basins eliminat from ninety to ninety-eight per cent of all germs, is the best indication tha they will remove a corresponding number of disease germs. Kōrōsi, Budapest, has proved by statistics that of seven thousand residents in th most fashionable part of his native city, those who used filtered water contributed $9\frac{8}{10}$ cases per one thousand, while the consumers of unfiltered wate furnished $14\frac{1}{10}$ cases per one thousand.

Professor Mallett, of the University* of Virginia, says "No known poison, in the diluted state, will produce the effect which have been traced to drinking water contaminated wit human excreta; in fact, there seems to be no dilution which ca make such polluted waters safe. They are the culture fields fo the germs of the most deadly diseases, such as cholera, typhoi fever and dysentery."

Dr. Frankland maintains that water once contaminated wit excretāl sewage, even if purified subsequently by filtration, i the most perfect way attainable, if not positively dangerous, i still unsafe to be used. "There are," he says, "animal organisms existing in sewage matter so minute as not to be seen b the unaided eye, and we have reason to believe that they eve exist outside the range of microscopic vision, and possess powers antagonistic to human life."

Dr. Macadam, of Edinburg, a thorough observer, and investigator, says: "The line must be distinctly drawn betwee non-putrescent organic matter and that which is putrescen Impregnations from household sewage form the most dreade contamination, and yield water which, though sparkling an clear, is yet most unwholesome and deadly."

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* Report of the National Board of Health.

It is very generally agreed that the discharge directly or indirectly of sewage matter of towns, whether it be excretal, household waste, or factory waste, and however diluted, cannot with safety be allowed to flow into any source of water supply used for dietetic or culinary purposes.

A pure and abundant supply of water is cheap at any price for any community, and "millions" for prevention would be better than "one cent" for cure. This is a question that affects the entire community and not the individual.

Rochard fixes the economic value of an individual at what he has cost his family, the community or the State for his living, development and education. Practically this is a loan from the social capital, until he can restore it by labor. The value of this cost has been fixed at from one thousand to five thousand dollars. Let it be assumed the average is three thousand dollars, every death then of an adult person is the withdrawal of three thousand dollars from the earning power of the community.

Statistics show that nine to twelve per cent of typhoid fever cases are fatal. These cases are mostly among adults, and hence the producing class. Typhoid fever is a water-borne disease. Allen Hazen,* says: "A reduction of the annual death rate by seven will warrant the construction of filter plants when a life is valued at five thousand dollars, and a reduction of seventy will save enough to the community in one year to pay for the construction of a filtering plant."

THE INVESTIGATION OF PUBLIC WATER SUPPLIES.†

One of the most important factors in the prolongation of life and preservation of health in any community is a pure and wholesome water supply. The necessity of measures which enable municipal authorities to secure such water, in quantities to meet all demands, is now fully recognized by every intelligent citizen, who also knows that pure sources of supply can generally be determined only by a thorough and careful investigation. As the population of our country increases the sources of contamination likewise multiply; so year after year it becomes more and more difficult to secure an adequate supply of water for cities and towns that shall be entirely free from dangerous impurity. In mountainous regions, where the conditions for self-purification are most favorable, we generally find the purest waters in great abundance; yet in the Mississippi Valley, where the streams are generally sluggish and frequently heavily laden with organic impurity, and in the Eastern States, where the rivers are sewer-polluted, the problem of securing pure water is difficult, and it is sometimes almost impossible with limited means to furnish a supply that is beyond dispute in its quality.

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*Hazen on "Filtration of Public Water Supplies."

†By Floyd Davis, formerly chemist of the State Board, and presented at the August meeting, 1895.

Many of our cities and towns lie adjacent to public watercourses, from which the water, polluted or otherwise, is pumped through mains, without proper purification, to be drunk by the people. Under such a disregard for sanitary considerations it is not strange that we are still maintaining in some parts of the country a typhoid fever rate higher than that prevailing in any other civilized country. Our typhoid death rate is too frequently many fold what it is in some European cities, like London and Berlin, which have expended millions of dollars to secure for their citizens a pure and wholesome supply of filtered water.

The ideal water for manufacturing and domestic purposes is distilled, and the amount of impurities, both inorganic and organic, found in the natural water is, therefore, a measure of its purity. It is rare that the mineral constituents have any marked effect on the quality of a water for drinking, since the poisonous compounds of barium, iron, zinc, copper, lead and arsenic, which may exist in it, are not often found in sources that are available for the supply of cities and towns, and in the sanitary investigation of a water supply we do not usually look for these substances. But the mineral constituents have a bearing upon the use of a water for boiler and manufacturing purposes. Its suitability for the generation of steam is determined mainly by the amount of lime, magnesia and mineral acids which it may contain, since these bases incrust the boiler and the acids corrode it. Magnesium chloride is especially objectionable. The mineral salts also characterize a water for manufacturing purposes, since a hard water containing much iron is unsuited for the manufacture of starch; a water having much magnesium in it is not desirable in the manufacture of beer, while water for distilleries should be as pure as possible.

These are considerations of importance only for particular purposes, but every public water supply must be used domestically by large numbers of people, and the substances which vitiate it for such purpose are of greatest importance in its sanitary investigation. They are organic, both vegetable and animal, and exist in different proportions in all natural waters that have any communication with the surface of the soil. The manner in which they gain access to water, and their relations to health and disease, have been discussed in a former paper. Suffice it, therefore, to say here that decaying animal matter is indirectly far more dangerous than decaying vegetation, for it is from animal sources that the infectious bacteria, now considered the real agents of disease, are mainly derived. Upon the danger from these various impurities is based our classification of water supplies.

Whenever I am called upon to investigate the water supply of a city, which may include wells and other sources, I generally classify waters under five divisions, as follows:

1. *Excellent waters*, or those which are so pure and free from suspended matter that aëration and filtration would scarcely improve them. Aërated distilled water and the water from some springs in granite regions belong to this class, but it is rare that a chemist has to investigate them.

2. *Permissible waters*, or those which can be used constantly for all domestic purposes, without any danger of injurious effects. They are

waters which, however, can be improved by better methods of storage, or by a thorough filtration. Nearly all drinking waters belong to this class.

3. *Suspicious waters*, or those which are liable at any time to produce ill-effects, or to become so polluted by an influx of filth that they may become bad, or even very dangerous. I always recommend that suspicious waters be first thoroughly boiled, and then filtered, before being used for drinking.

4. *Bad waters*, or those which are sufficiently polluted to render them unfit for domestic use. These may not be immediately productive of disease, but I believe that they lower the vitality of the system and render it very susceptible of zymotic infection. On account of the nature of their pollution, common intelligence should prevent us from using them.

5. *Very dangerous waters*, or those which are polluted by direct communication with cesspools or privies, and in which the pollution is of so high a degree that they should be immediately condemned. Such waters are often productive of typhoid fever and other filth diseases.

In passing upon the quality of a public water supply it is, therefore, essential that all water flowing into it which is seriously polluted with sewage should be rejected. There are other waters, not thus polluted, that have a disagreeable taste and odor, and are manifestly unfit for drinking; still, they are sometimes used in public supplies, largely from necessity.

Cisterns and common surface wells are too infrequently used for public purposes to be considered here, and there are few or no apologies for such a supply in any wide-awake town, although from a sanitary standpoint they deserve our most careful consideration. Springs are used as a source of public water supply in many mountainous regions where the topographical conditions are favorable for their utilization, but in other localities ground waters, stored surface waters, rivers, and lakes are generally used. In many parts of Europe several of these waters are introduced into one city, sometimes at great expense. In this country the usual source is the one that is most convenient to adopt, which is somewhat determined by the topographical conditions of the locality. Thus Denver has a delightful water supply furnished by mountain springs and melting snow, supplemented by hundreds of artesian wells; some cities, like Columbus and Des Moines, located near never-failing streams, utilize the ground waters in the adjacent gravel beds; Boston and New York, having no adequate supply of fresh water near by, store in artificial lakes or reservoirs the rainfall on the nearest elevated water shed; some cities, like Cincinnati, St. Louis, and Omaha, situated on rivers, secure their water supply from these natural channels; while other cities, like Cleveland and Chicago, having great lakes at their doors, reach out into these for their waters.

Spring water which flows from subterranean sources is generally pure and wholesome, because from necessity it is free from organic contamination, and, when the springs are remote from the agencies of pollution, their water is certainly our most healthful beverage. It is so much superior to surface water for domestic use that some cities have incurred great expense to introduce it for a public supply, and in some instances have thus freed themselves of much sickness and a high rate of mortality.

Ground water in regions remote from habitations is generally very pure, and, although it may be, and often is, derived from polluted rivers, yet, owing to its thorough natural filtration, it cannot often be considered unwholesome. Indeed, with the exception of springs and some mountain streams, I consider ground water by far the best general supply for a city, and in the Mississippi valley this can generally be easily obtained. When such water is secured from wells and filtering galleries in beds of gravel above a city, or along a river course some distance from its channel, it is generally clear, sparkling, and nearly free from organic matter. This is especially true when the gravel beds are separated from the surface by an impervious stratum of clay, and the supply of water comes for long distances by filtration from rivers or other inexhaustible sources. Such water owes its purity to sedimentation and thorough filtration, combined with oxidation; for, during the passage of the water from its source to the well or gallery, the suspended decaying organic matter and the bacteria are retained in the soil, while the soluble organic substances are oxidized into harmless inorganic compounds. It is generally superior to artificially purified water, inasmuch as it is rendered pure long before being utilized, while surface water is purified as used.

Stored surface waters, rivers, and lakes may be very similar in their impurities. The former, when gathered on uninhabited water sheds, will contain little else that is harmful than decaying vegetable matter. But rivers are the receptacles of the waste products of the inhabitants of the districts through which they flow, and are sometimes very dangerous to use. When it becomes known that a surface water is in any considerable degree contaminated with the wastings of feed-lots and slaughter-houses, the refuse of manufactories, dead and decaying animals, and the drainage filth of many thousand square miles, it should be avoided; and, when it is further contaminated with sewage, or privy and cesspool drainage, or in any way mixed with the waste products of the human body, its use for drinking and cooking should be prohibited, for some of our most dreaded diseases are now traced to such water supplies.

My reason for rejecting all such water as unfit for human use depends also upon two other principles well established in all civilized communities. The first is that common decency causes every intelligent person to rebel against the use of sewage-polluted water, for no one but a savage, or a lowly-organized scavenger, will wilfully devour the urine, excrement, washings, and filth of man and beast. That such filth is actually finding its way into many rivers is beyond dispute, for the many thousand head of cattle and hogs now kept along our western rivers during the feeding season contribute annually an immense amount of filth to these waters. Tramping the clay soil soon renders it impervious to the rains, and consequently nearly all the filth finds its way in rainy seasons through the small streams into these rivers. In time of high water, there is only little sedimentation of these impurities, and they are carried in suspension and solution down to and past the intake of waterworks of cities and towns located below. In time of low water much of the heavier suspended matter settles to the bottom of these rivers, there to decay and pollute the water, or to be washed down the stream at the next fall of rain.

The second principle is that, when a water has once become infested with disease germs, it can never be entirely purified, except by distillation or sanitary filtration. Such germs are liable to be contributed to these rivers at any time, should a sporadic case or an epidemic of typhoid fever occur in the drainage area above, and the dejections of the patients go into the river. The impurities in these river waters are such as will favor the multiplication and development of germ life, and the living organisms, instead of disappearing, sometimes become more numerous as the rivers are descended. During high water, when there can be no permanent sedimentation, these waters become constantly more impure in their flow down the river; so, in using them as a source of supply, we must expect to be confronted with all the evil effects that can arise from the sewage and filth that go into them.

From whatever source a public water supply is derived, it should be borne in mind that it will not remain constant in purity throughout a whole season, for there are fluctuations depending upon rainfall, temperature, season, vegetable and animal contamination, and communication with other morbific agents. These variations and the probable degree of contamination of the public water supply should be investigated by the health officers, city physician, or other responsible and capable person, who should communicate his results to the people; and these investigations should extend to the surface wells and other sources of water, which the more ignorant and less fortunate classes are often compelled to use. It is a comparatively easy matter for one somewhat skilled in scientific manipulation to make a few qualitative tests that will enable him to determine with considerable accuracy whether or not a given water is badly polluted. For such examination I usually recommend two tests,—one for chlorine and the other for decaying organic matter.

In most parts of the country away from the sea and salt wells the purest ground and surface waters do not contain more chlorine than suffices to give, with a solution of silver nitrate, a faint opalescence. In testing water with this reagent, its action on a sample of known purity near by should be determined, to use as a guide in comparing other waters. And, whenever an experimental sample shows a decided milkiness with this reagent, then sewage contamination is to be suspected, in proportion to the amount of the precipitate; for sewage, dish-water, cesspool drainage, and other similar polluting agencies generally contain much chlorine. This test is also a valuable means of detecting drainage from a privy-vault into a well. It may be made by first determining the degree of opacity produced in the water by this reagent, and then throwing about fifty pounds of salt into the vault, together with several barrels of water. After a few days, again examine the well water with a silver solution, and, if there is a noticeable increase of chlorine, contamination is quite certain, because the salt, which contains this element, has probably washed from the vault into the well. This method of testing gives results which will frequently surprise those unfamiliar with the subject.

Decaying organic matter is never found in appreciable quantity in pure water. If to a glassful of such water a few drops of sulphuric acid and a few drops of a dilute solution of potassium permanganate be added, a permanent pink color is produced; but, if the water contains decaying organic matter, then the pink color becomes fainter and finally disappears. In the hands of an expert this is an important test, but it cannot be relied on with a novice since ferrous sulphate, hydrogen sulphide, and other reducing agents, sometimes present in water, produce similar results. But, when a water shows an excess of chlorine and bleaches potassium permanganate, it is certainly suspicious, and should be analyzed by an expert. My advice in all cases where persons seek counsel is to make the experiments given above, and, if the results are not satisfactory, to send the water to an experienced chemist, with necessary information regarding its source, and have a thorough analysis made.

The most extensive investigation of the quality of a water supply involves questions of a chemical, microscopical, biological, and physiological character, together with an examination of the surroundings of the source of supply; and in all this much depends upon the judgment and experience of the analyst, for water analysis is certainly among the most delicate of all chemical operations, and its proper interpretation requires great experience. The chemical analysis should determine the present and past pollution of water, and distinguish between vegetable and animal matter; the microscope should reveal floating substances, like fragments of hair, excreta, and other filth derived from surface drainage or sewage, which show at once that the water containing them is loathsome and unfit for domestic use; the bacteriological investigation should be for the purpose of detecting infectious germs, but it is more frequently to determine the number of micro-organisms in a given volume of water; while the physiological test should be made in order to afford opportunity for studying the effect of the water on the lower mammals. Since bacteria are now believed to be the direct or indirect agents of all zymotic diseases, the determination of the conditions favorable for their development, as shown by the chemist, or of their actual existence in water, as shown by the bacteriologist, is the real aim of sanitary water analysis. Without discussing the relative importance of the chemical, microscopical, bacteriological, and physiological examinations, it is only necessary to say here that, whenever a chemical and microscopical analysis reveals an excess of filth or sewage in a water, its use should be discontinued without further investigation: for the time required for a thorough bacteriological analysis renders such too expensive for general use, to say nothing of the common failure to recognize the infectious germs. The most experienced water analysts look more to the chemical and microscopical results than to the bacteriological, because the chemical and microscopical methods of study are highly perfected, while the bacteriological methods are yet in a chaotic state so far as utility is concerned.

It is my opinion that the past history and associations of many waters are often sufficient to condemn them, no matter how free they may seem to be from organic impurity; and it is not always necessary to make a laboratory investigation to condemn some of the polluted ones. Then, too, every analyst knows, or should know, the importance of having a thorough knowledge of the surroundings of the source of supply, before giving an opinion of the quality of a water for drinking; and I believe that no competent chemist will claim that a water high in chlorides and nitrates, although organically quite pure, is good, without a knowledge of the agencies which may pollute it. Inexperienced chemists are in error in sometimes relying wholly, in testing a water, upon the Wanklyn process, which determines the free and albuminoid ammonia, but gives no knowledge of its past history, or of the products of oxidation of its organic matter. Any analyst who finds a water contaminated beyond a reasonable limit of safety is justified in condemning it; but, because he may fail to find any of the immediate products of decomposition of organic matter, he would not, in my judgment, be warranted in pronouncing such water good, unless he knows that such products have never existed in it; for it frequently happens that a water having direct communication through the soil with cesspools and privies has but little organic matter in it. The same is true when lime is used to disinfect a privy-vault. In all such cases the amount of chlorides and nitrates in the water is excessively high, and generally the total solids and loss on ignition are also large. Still, this is not different from what we often find in good mineral waters, and a chemist who relies solely on his laboratory determinations might claim that such water is good and safely potable, while in fact it may be a most dangerous beverage and badly infested with disease germs. Thus it is that an opinion of the quality of a water should be given only after a careful consideration of the surroundings of the source of supply. More than this, I believe that no chemist should, and no experienced reputable chemist would, venture a *decisive* opinion as to the purity and wholesomeness of a water supply for a city or town without a *personal* inspection of the topography of the surrounding territory. It is unwise, if not impossible, to predicate an opinion upon the investigation and report of inexperienced men, or to determine the present and prospective soil pollution without a personal inspection of the entire drainage area.

England formerly led the world in the investigation of public water supplies, but in recent years Massachusetts has given us classic results in this as well as in the filtration of water; so in this country we are just beginning to realize that pure water, which was once the luxury of the few, is now the necessity and pleasure of the many. The benefits which have resulted from these and other investigations are attested by the healthful development and increased civilization of our race; for it is now admitted by all competent judges that the progress made by the inhabitants of manufacturing towns, in decency, cleanliness, self-respect, and morality, since the introduction of a pure public water supply, is as striking as the improvement in their health, which shows that pure water is a great moral, as well as hygienic, agent.

PROTECT THE RIVERS

This State is laying up wrath against the day of wrath in the neglect to protect the rivers and streams from contamination. Polluted watercourses are a constant menace to public health. It is an erroneous belief that running water purifies itself, especially in the removal or destruction of germs of some of the most formidable diseases which affect the human race. Not only is the surrounding atmosphere poisoned, but fish are poisoned and their decomposing bodies are added to the polluted mess.

The rivers should be kept free from contamination. The Almighty never intended them to become catch-basins of filth and carriers of the sewage of cities and towns. Rather was it that they should be a source of beneficence to mankind in many ways. The time is coming, and not far distant, when a reversal of this policy of neglect will be imperatively demanded.

Already in Iowa serious apprehensions are being aroused on this subject. The city of Waterloo, one of the most progressive in Iowa, lying on both sides of the beautiful Cedar river, is to-day greatly exercised because the river from which she receives her water supply is the receptacle for all the sewage of Cedar Falls, a large and growing city but a few miles above.

It would seem that in the near future either Cedar Falls will have to dispose of her sewage in some other way or Waterloo will be obliged to abandon the present source of water supply.

RAILROADS.

It is gratifying to report that progress is still being made in adopting appliances by railroad companies, for the protection of human life. Not only is this true regarding air-brakes and couplers, but in the sanitary and hygienic construction of cars, in response to an increasing demand of public sentiment. The advancement in this direction is noticeable on all the great through lines. To receive the commendation and approval of the public, for comfort, elegance, heating, lighting and ventilation, is now the ambition of railway managers, and it is upon the preponderance of these features they base their claim for patronage. What was considered good a few years ago, would to-day entirely fail to satisfy the public demand.

The Iowa Railroad Commissioners' report for 1895–6, still continues barren of evidence of compliance with the statute regarding the placing of air-brakes, and automatic couplers on cars used in this State. The statistics respecting accidents, however, indicate an increase in these appliances. The following are casualties for the years named:

	1890.		1891.		1892.		1893		1894		1895.		1896.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Employés	35	442	73	579	82	601	81	682	48	367	47	330	36	411
Passengers	4	25	9	67	5	80	17	78	7	62	4	39	6	62
Others	33	46	69	101	91	92	79	64	90	62	82	74	36	84
Total	72	513	151	747	178	773	177	824	145	491	133	443	136	557
Coupling cars	8	149	14	203	13	212	10	196	7	91	5	80	6	97
Falling from trains	5	44	17	83	23	82	22	68	17	32	20	37	19	35
Overhead obstructions	....	....	4	4	2	17	....	3	2	6	2	....	3	2
Collisions	2	21	15	55	4	22	28	57	8	15	3	9	2	19
Derailments	3	16	5	42	5	19	8	65	5	46	133	29	5	41
At highway crossings	7	7	14	23	1	8	13	10	16	27	13	19	12	26
Trespassing on track	....	....	....	....	....	....	31	25	41	8	27	10	41	23
Caught in frogs	....	....	....	....	....	....	2	6	....	19	....	4	....	5
Getting on and off trains	....	....	....	....	....	....	12	49	15	33	10	32	4	37
Stealing rides	....	....	....	....	....	....	19	18	5	6	8	12	15	18
Intoxicated	....	....	....	....	....	....	1	2	4	4	2	1	2	2
Miscellaneous	51	276	71	457	34	383	31	325	25	204	34	21	27	252
Total	72	513	151	747	178	773	177	824	145	491	133	443	136	557

The report of the Inter-State Commerce Commission for the year ending June 30, 1896, gives the following casualties on all railways in the United States for the years named:

YEAR	EMPLOYES.		PASSENGERS.		OTHER PERSONS.		TOTAL.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
1895	1,811	25,696	170	2.375	4.155	5,677	6,136	33,748
1894	1,823	23,422	324	3,034	4,300	5,433	6,447	31,889
1893	2,727	31,729	299	3,229	4,320	5,435	7,346	40,393
1892	2,554	28,267	376	3,227	4,217	5,158	7,147	36,652
1891	2,660	26,140	293	2,972	4,076	4,769	7,029	33,881
1890	2,451	22,396	286	2,425	3,598	4,206	6,335	29,027
1889	1,972	20,028	310	2,146	3,541	4,135	5,823	26,309
1888	2,070	20,148	315	2,138	2,897	3,602	5,282	25,888

The distribution of casualties is as follows, employés being classified as trainmen; switchmen, flagmen, and watchmen; and other employés:

1895.	EMPLOYES.							
	TRAINMEN.		SWITCHMEN, ETC.		OTHER EMPLOYES.		TOTAL.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Coupling cars	189	6,077	90	1,826	12	234	291	8,137
Falling from trains	343	2,543	49	363	60	391	452	3,297
Overhead obstructions	42	294	1	27	9	22	52	343
Collisions	104	742	3	45	27	221	134	1,008
Derailments	116	548	1	38	15	115	132	701
Other train accidents	32	374	3	9	7	51	42	434
At highway crossings	2	12	11	18	4	27	17	57
At stations	30	499	17	86	45	745	92	1,330
Other causes	159	3,659	73	521	367	6,209	599	10,389
Total	1,017	14,748	248	2,933	546	8,015	1,811	25,696

1895.	PASSENGERS.		OTHERS.					
			TRESPASSING.		NOT TRESPASSING.		TOTAL.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured
Collisions..	8	398	31	24	9	63	40	97
Derailments	17	358	37	41	10	43	47	84
Other train accidents	5	89	41	80	4	30	45	110
At highway crossings	3	14	133	176	372	771	505	947
At stations	31	492	323	496	53	161	876	657
Other causes	106	1,024	3,066	3,532	76	350	3,142	3,782
Total	170	2,375	3,631	4.359	524	1,318	4,155	5,677

The following table shows the number of automatic brakes and couplers applied during the year:

	LOCOMOTIVES.				CARS.			
	AIR BRAKES.		COUPLERS.		AIR BRAKES.		COUPLERS.	
	1894.	1895.	1894.	1895.	1894.	1895.	1894.	1895.
Passenger	9,770	9.876	3,479	3,893	32,403	32,384	31,916	31,971
Freight	15,983	16,772	1.808	2,039	264,484	295,073	317,896	366,985
Switch	3,033	3,038	217	389	....	....	....	....
Unclassified	453	439	129	141	....	....	....	....
In company's service	....	....	....	....	4,466	4,976	2.676	3,438
Total	29,239	30,065	5,123	6,642	301,758	332,423	352,488	402,394
Increase	..	826	....	1,329	....	30,680	....	49.906

From these tables it will be seen that practically all passenger locomotives are supplied with air brakes, yet six thousand one hundred and six remain without automatic couplers; of twenty thousand and twelve freight locomotives three thousand three hundred are without air brakes, and seven thousand nine hundred and seventy-three without automatic couplers. Of the thirty-three thousand one hundred and twelve passenger cars in service, thirty-two thousand three hundred and eighty-four were supplied with air brakes and thirty-one thousand nine hundred and seventy-one with automatic couplers. Of the one million one hundred and ninety-six thousand one hundred and nineteen freight cars in service, only two hundred and ninety-five thousand and seventy-three were supplied with air brakes, and three hundred and sixty-six thousand nine hundred and eighty-six with automatic couplers. It is apparent that much remains to be done to comply with the law which requires all railway equipment to be fitted with these appliances by January, 1898.

A notable feature of these tables is that the increase of these safety appliances does not show a corresponding decrease in casualties among trainmen, for whose benefit they are more especially intended. In Iowa there was one more killed in 1896 than in 1895 and only three less injured. There were also three more persons killed and one hundred and fourteen more injured in 1896 than in 1895. It is quite evident trainmen do not use the appliances provided for their safety.

For the railway service at large the statistics show more favorable results. The following table shows the number of employés, trainmen and passengers for one killed and for one injured in the United States for the year ending June 30, 1895:

YEAR.	NUMBER OF EMPLOYÉS FOR ONE.		NUMBER OF TRAINMEN FOR ONE.		NUMBER OF PASSENGERS FOR ONE.	
	Killed.	Injured.	Killed.	Injured	Killed.	Injured.
1895	433	31	155	11	2,984,832	218,651
1894	428	33	156	12	1,668,791	178,210
1893	320	28	115	10	1,985,153	183,823
1892	322	29	113	10	1,491,910	173,823
1891	296	30	104	10	1,811,642	178,604
1890	306	33	105	12	1,727,789	203,064

The following table shows the number of safety brakes and couplers in use on roads in Iowa:

	LOCOMOTIVES.				CARS.			
	AIR BRAKES.		COUPLERS		AIR BRAKES		COUPLERS.	
	1895.	1896.	1895.	1896.	1895.	1896.	1895.	1896.
Passenger and freight	4,241	4,234	......	......		....	......	......
Passengers	......	......	......	......	3,700	4,279	3,360	4,108
Freight	......	......	......	......	49,876	82,171	55,702	66,610
Increase	..	....	......	......	.....	33,372		787

Total locomotives in use, 1893, 4,610; in 1896, 5,183.
Total passenger cars in use, 1895, 3,772; in 1896, 4,844.
Total freight cars in use, 1895, 151,972; in 1896, 178,185.

CAR SANITATION.

While advancement is being made to lessen the danger to life and limb of railway employés, sanitarians are agitating reforms for the protection of the millions who travel upon cars. The American Association of Railway Surgeons is doing commendable service in that direction. State Boards of Health are crystalizing their efforts in this behalf, and car sanitation is receiving earnest consideration. It may be confidently expected that in the not far distant future these houses wheels—especially the sleeping cars—will be made fit habit tions for men and women.

At a late meeting of the American Public Health Associatio Dr. P. G. Conn of Concord, N. H., chairman of the committ on "Car Sanitation," concluded his report as follows:

> In conclusion, your committee have to add that the *Railway Surge* a journal published in the interest of the National Association of Railw Surgeons, at Chicago, early in 1896, sent out a circular of inquiry to ma of the principal railway surgeons of the country, of which the following a copy, and we append a summary of the answers received as it was recor by the editor:
>
> 1. Is it possible to construct comfortable day coaches and sleep which can be frequently subjected to efficient disinfection?
>
> 2. What modification of the cars at present in use would you sugg
>
> 3. How would you disinfect them, and how often?
>
> 4. How would you ventilate them? What would you regard as most efficient manner of caring for sputum on railway trains?
>
> 5. Do you consider the present closet arrangements in cars satisfacto If not, what changes do the conditions require?
>
> 6. What restrictions and regulations should we have in regard to transportation of patients ill with infectious diseases? Have you any s gestions as to the provisions which should be made for their care *en ro*
>
> 7. Do you consider it dangerous to the healthy to travel and sleep in same car with tuberculous patients? What particular provisions would make for the transportation of the tuberculous patients? Do you thin preëminently necessary to separate the consumptive people from healthy? If not, what means would you suggest to prevent infection?
>
> 8. How far would you permit a tuberculous patient to travel with rest?
>
> Summarizing the answers we arrive at the following conclusions: Th is no question of the possibility of constructing an entirely sanitary and it might be that such a car could be made as attractive as those nov use. At the same time the attitude of the public toward such a change construction is uncertain, and no one can tell, until it has been tr whether the public would welcome or resent the novelty. In the abse of such a general change in car construction much good can be accomplis (especially on lines running to health resorts) by use of (a) hospital car special cases, and (b) cars with compartments for the use of invalids.
>
> Meanwhile, with the existing cars, certain precautionary measures eminently desirable, which may be stated as follows:
>
> 1. All cars should be thoroughly cleaned and disinfected after ev run (or at the end of each twenty-four hours on short runs), the us chemical disinfectants and super-heated steam being the means chi recommended.
>
> 2. Some efficient system of ventilation of all cars is generally and ciently needed.
>
> 3. Closets should be improved so that the fæcal matter would retained in some attachment to the closet, under proper conditions, to

deposited at specified places instead of being scattered promiscuously along the line as now.

4. Sputum should be received in cuspidors, in a bichloride solution of mercury and not be allowed to be ejected over the floor and carpets.

The placing of rigid restrictions round the transportation of tuberculous patients is regarded as difficult, but much good might be done by the use of hospital and compartment cars as indicated: and such patients should not, as a general rule, be allowed to travel for long distances at a stretch.

It can readily be seen that this problem is hedged about with many difficulties. To move corporations to a conviction of their humane relation to the public; to awaken, centralize, and direct public sentiment so that it shall demand its rights; and to educate the public in the proper exercise of those rights are some of the important duties of the hour.

As said the immortal Galileo: "*E pur si muove*." "The world moves." Sanitation and hygiene are making rapid pace all over the world.

The transportation company that best conforms to the advancing public demand, and receives its approval, will find in return a reward in dollars and cents that will amply repay for any money or pains expended.

CORPSES.

During the past two years strenuous effort has been made by the several railroad baggage associations and State boards of health to devise and agree upon some method for the transportation of corpses, which should be uniform in operation over all railroads, and in all States. So combined in operation are the railroads in this country, such uniformity of regulations is imperatively demanded. From the outset the Iowa State Board has taken an advanced position respecting the protection of not only train men, but the public generally, from danger in such transportation. Especially was this so respecting the requirement of a permit from the Board for the disinterment of a corpse—a rule which led to some confusion among railroads, in cases where in States having no such rule bodies were disinterred to be transported into, or through Iowa. The question arose as to whether or not the rule did not interfere with inter-state traffic, and it was submitted to the attorney-general, whose opinion will be found on page 42.

At a recent meeting of the National Association of Railro
Baggage Agents, the subject was fully discussed and the f
lowing rules were presented and recommended to the seve
individual associations for adoption. They were also presen
to a joint conference of representatives of State and Provin
Boards of Health, General Baggage Agents, and Fune
Directors' Association, and approved. They are as follows

RULES RECOMMENDED FOR THE TRANSPORTATION OF DE BODIES.

Rule 1. The transportion of bodies dead from small-p
Asiatic cholera, yellow fever, typhus fever or bubonic pla
is absolutely prohibited.

Rule 2. The bodies of those who have died of diphthe
(membranous croup), scarlet fever (scarlatina, scarlet ra
glanders, anthrax or leprosy, shall not be accepted for tra
portation unless prepared for shipment by being thoroug
disinfected by arterial and cavity injection with approved
infectant fluid (b) disinfecting and stopping of all orifices
absorbent cotton, and (c) washing the body with a disinfect
all of which must be done by an embalmer holding a certifi
as such, approved by the State Board of Health or some ot
health authority.

After being disinfected as above, such body shall
enveloped in a layer of cotton not less than one inch th
completely wrapped in a sheet and bandaged, and incased i
air-tight zinc, tin or copper or lead-lined coffin, or iron cas
all joints and seams hermetically soldered, and all enclose
a strong, tight wooden box. Or, the body being prepared
shipment by disinfecting and wrapping as above, may
placed in a strong coffin or casket, and said coffin or ca
encased in an air-tight zinc, copper or tin case, all jo
hermetically soldered, and all enclosed in a strong out
wooden box.

Rule 3. The bodies of those dead from typhus fever, p
peral fever, erysipelas, tuberculosis, measles, or other dan
ous communicable diseases other than those specified in R
One and Two, may be received for transportation when prep
for shipment by filling cavities with an approved disinfect
washing the exterior of the body with the same, stopping
orifices with absorbent cotton and enveloping the entire b
with a layer of cotton not less than one inch thick, and

wrapped in a sheet and bandaged, and encased in an air-tight coffin or casket, provided that this shall apply only to bodies which can reach their destination within forty-eight hours from time of death. In all other cases such bodies shall be prepared for transportation in conformity with Rule Two. But when the body has been prepared for shipment by being thoroughly disinfected by an embalmer holding a certificate as in Rule Two, issued by the State Health authorities, the air-tight sealing may be dispensed with.

Rule 4. The bodies dead of those diseases that are not contagious, infectious or communicable may be received for transportation when incased in a sound coffin or casket, and enclosed in a strong outside wooden box, and provided they reach their destination within thirty hours from the time of death. If the body cannot reach its destination within thirty hours from time of death, it must be prepared for shipment by filling the cavities with an approved disinfectant, washing the exterior of the body with the same. stopping all orifices with absorbent cotton, and enveloping the entire body with a layer of cotton not less than one inch thick, and all wrapped in a sheet and bandaged, and encased in an air-tight coffin or casket. But when the body has been prepared for shipment by being thoroughly disinfected by an embalmer holding a certificate as in Rule Two, issued by the State health authorities, the air-tight sealing may be dispensed with.

Rule 5. In cases of contagious, infectious or communicable diseases the body must not be accompanied by persons or articles which have been exposed to the infection of the deceased, unless certified by the health officer as having been properly disinfected; and before selling passage tickets agent shall carefully examine the transit permit and note the name of the passenger in charge, and of any others proposing to accompany the body, and see that all necessary precautions have been taken to prevent the spread of the disease. The transit permit in such cases shall specifically state who is authorized by the health authorities to accompany the remains. In all cases where bodies are forwarded under Rule Two, notice must be sent by telegraph to the health officer at destination, advising the date and train on which the body may be expected. This notice must be sent by, or in the name of the officer at the initial point, and to enable the officer at destination to take all necessary precautions at that point.

Rule 6. Every dead body must be accompanied by a p in charge, who must be provided with a passage ticke also present a full first-class ticket marked "corpse," fo transportation of the body, and a transit permit, showin physician's or coroner's certificate, name of deceased, dat hour of death, age, place of death, cause of death, and i contagious, infectious or communicable nature, the poi which the body is to be shipped, and when death is caus any of the diseases specified in Rule Two, the name of authorized by the health authorities to accompany the The transit permit must be made in duplicate, and the sign of the physician or coroner, health officer and undertaker be on both the original and duplicate copies. The undert certificate and paster of the original shall be detached fro transit permit and pasted on the coffin box. The physi certificate and transit permit shall be handed to the passe The whole duplicate copy shall be sent to the official in c of the baggage department of the initial line, and by the secretary of the State or Provincial Board of Health State or Province from which such shipment was made.

Rule 7. When the dead bodies are shipped by expres whole original transit permit shall be placed upon the o of the box, and the duplicate forwarded by the express to the express agent and the secretary of the State or Prov Board of Health of the State or Province from which said ment was made.

Rule 8. Every disinterred body, dead from any dise cause, shall be treated as infectious or dangerous to the health, and must not be accepted for transportation unle removal has been approved by the State or Provincial authorities having jurisdiction where such body is to be terred, and the consent of the health authorities of the lo to which the body is consigned has first been obtained; a such disinterred remains must be enclosed in a herme sealed (soldered) zinc, tin or copper lined coffin or box.

Bodies deposited in receiving vaults will be treated an sidered the same as buried bodies.

These rules will come before the several State an vincial Boards for adoption or revision.

The rules and regulations of the Iowa State Board of respecting the transportation of corpses, now in forc observed by all railway lines operated in Iowa, are prin page 43.

MINER'S OIL.

Since the state entered upon a systematic supervision of mining for the protection of the lives and health of the miners, the quality of the oil used in miners' lamps has been the subject of more or less criticism of the State Mine Inspectors. It has caused alarm, not only for the health of the miners, but for the safety of the mines.

The smoke thrown off by the lamps is so dense as to hide other elements of danger; retard the flow of the necessary volume of air, and also render even the restricted air unfit for respiration.

Originally the tallow candle was used for lighting purposes; then came lard, both of which were satisfactory. Lard, when pure and made from healthy hogs, has a specific gravity of from twenty-three to twenty-three and one-half degrees; gives a clear, bright light quite free from smoke or offensive odor, but when made from hogs long dead, and offal, partially decomposed, gives an odor very offensive, and highly objectionable for use in mines.

A few years ago cotton seed oil came into market. It proved to be adapted to miners' use and being sold at much less price, soon forced lard almost entirely from use. This oil of Winter weight has a specific gravity of twenty to twenty-two, and congeals at about thirty-two degrees Fah. The Summer weight has a specific gravity of twenty-two to twenty-four, and congeals at forty-five to fifty degrees. The heavy grades burn slowly and generate objectionable quantities of smoke, especially when the seed has been improperly stored, and becomes heated and musty.

Miners soon discovered that this heavy oil could be improved in illuminating by adding mineral oil, which became known as "bung-hole" mixing. Experience proved that mixing could not be successfully accomplished in that way.

The mixing scheme of the miners was quickly seized by refiners and dealers in mineral oil, and an unscrupulous system of adulteration commenced which increased to such proportions as to create alarm, not only regarding the lives of miners, but of the mines. Ohio and other States commen thorough and systematic investigation of the extent of adulteration, the result of which is given in the official re of their mining departments. Samples of oil taken in va districts were submitted to inspection and analysis by e chemists. In one instance of thirty-eight samples test Ohio, only eight were found pure. The remainder were terated with a mixture of eight to eighty per cent of mi (kerosene) oil. Some barrels did not contain three gallo cotton seed oil in the entire contents. The brands on the rels were no indication of the contents. Barrels made b same refiner and bearing uniform labels of quality cont different degrees of mixture, the variation being eight to per cent.

The adulteration is limited only by the competition o trade, and the price becomes the standard rather tha quality.

Not only does this adulteration endanger the healt miners and those employed in mines, but causes the cond of the mine to become dangerous. The miners are also grossly defrauded in the price paid for oil. Pure cotton oil, refined for miner's use is worth forty cents per g So-called miner's oil is sold at twenty-seven to thirty ce the retail dealer, and by him to the miner at ninety ce one dollar. The refiner by withdrawing fifteen gallon substituting for cotton seed oil an equal amount of miner at ten cents a gallon, produces an article that sells at tw seven cents, thereby receiving three cents a gallon for pounding.

This oil is retailed to the miners at ninety-five cent gallon and the profit is thirty dollars per barrel.

In 1892 there was very near a failure of the hog crop country, which largely increased the price of lard. In pathy with this, and the increasing demand in various indu cotton seed oil rapidly advanced in price thirty-five cen gallon. This was the opportunity for unscrupulous deal increase the compounding and reap the benefit. They purchased empty barrels bearing the brand and label American Cotton Oil Company, and filled them with comp

The high price of lard and cotton seed oil in 1892 b into market an illuminant known as Miner's Sunshine. paraffine wax, a residuum of petroleum, a pure mineral pr and contains about three to four per cent of mineral oil, or sufficient to render it limpid and freely combustible at one hundred and ten degrees Fahrenheit temperature. It burns with a clear, white flame without smoke or odor. It has the advantage that it is not subject to fluctuation in price from failure of the crop, as are lard and cotton seed.

As a rule, miners have no opportunity to purchase oil other than at the mine, or the company's store, at extortionate prices. So grossly pernicious became this traffic, and so injurious the results, that Ohio, Illinois and other States sought to control it by legislation. Iowa, being without protection, was made the dumping ground for adulterated oil in all degrees of sophistication. In 1894 the mine inspectors made an effort to secure legislation thereon, and a bill passed the Senate but failed to receive final action in the House. In 1896 another and successful effort was made, and a law was enacted similar to the Ohio law. The law is as follows:

SECTION 1. That only pure animal or vegetable oil, or paraffine, shall be used for illuminating purposes in any coal mine in this State. If any person, firm or corporation, either by themselves, or agents, or employé, shall sell or offer for sale for illuminating in any coal mine in this State, any adulterated oil, or any mixture or compound oil, he shall be deemed guilty of a misdemeanor, and upon conviction thereof he shall be fined not less than twenty-five dollars nor more than one hundred dollars for each offense.

SEC. 2. If any mine owner, or operator, or employé of such owner or operator, shall knowingly use, or if any mine owner shall knowingly permit to be used for illuminating purposes in any coal mine in this State any adulterated, or mixed, or compound oil, he shall, upon conviction therefor, be fined not less than five dollars nor more than twenty-five dollars for each and every offense.

SEC. 3. It shall be the duty of the State Mine Inspector, whenever he has reason to believe that oil is being used, or sold, or offered for sale in violation of the provisions of this act, to take samples of the same and have them tested or analyzed, and if they are found to be impure he shall make complaint to the county attorney, who shall forthwith commence proceedings against the offender in any court of competent jurisdiction. For the purpose of this act the State Board of Health shall fix a standard of purity of oils and regulations for testing said oil, and said standard and regulations, when so fixed, shall be recognized in all the courts in this State.

SEC. 4. All reasonable expenses incurred in testing or analyzing oil under the provisions of section three of this act, shall be paid by the owner of the oil whenever it shall be found that he is selling or offering to sell impure oil in violation of the provisions of this act. Such costs may be recovered in a civil action, and in criminal prosecutions under this act such expense shall be taxed as part of the costs.

SEC. 5. Nothing in this act shall be held to prevent the use of electric lights in any coal mine in this State.

Under the provisions of this act, the State Board of Health promulgated the following rules:

RULE 1. The specific gravity of oil used for illuminating purposes in coal mines must not exceed twenty-four degrees, Tagliabue hydrometer, at sixty degrees temperature, Fahrenheit.

RULE 2. All oil must be tested in a glass-footed cylinder one and one-half inches in diameter, and eight inches deep. If the oil to be tested is below forty-five degrees Fahrenheit temperature, it must be slowly heated until it reaches eighty degrees temperature. Should the oil be above forty-five degrees temperature and below sixty degrees, it must be heated to seventy degrees, when in either case, it must be well shaken and allowed to cool gradually to a temperature of sixty degrees, when the test must be made.

RULE 3. In testing the gravity of oil the hydrometer must be, when possible, read from below, and the last line which appears under the surface of the oil shall be regarded as the true reading.

RULE 4. Where the oil is tested in difficult circumstances, an allowance of one-half of one degree may be made for error of parallax.

RULE 5. Paraffine wax shall not contain more than three per cent of oil, and the maximum melting point shall be one hundred and ten degrees, Fahrenheit.

To test the melting point of paraffine wax, place a chip of it on hot water, then allow the water to cool slowly, and note the temperature of the water when the wax globule loses its transparency.

RULE 6. All material used for illuminating purposes in coal mines shall be free from smoke, bad odor, and by-products of resin, known as mystic oil.

RULE 7. In all cases of doubt, or question as to an inspection, or as to the purity of oil or paraffine to be used in mines, a sample of the same shall be furnished the State Mine Inspector for chemical analysis.

CARE OF OUR INSANE BY COUNTIES.

There has been much discussion in Iowa within the last few years upon the relative merits of State care and county care of the insane, and as a result we have a growing tendency, apparently, in addition to the State hospitals to build new and enlarge the present county hospitals, in connection with the county poor farms.

There is great reason to fear this is not a wise conclusion. It would seem as if the experience and observation of the older States, where this mixed system of State and county treatment has been tried, should count for something.

fter an experience and careful observation covering many rs the State of New York, in 1890, adopted the system of ng the insane wholly cared for by the State. This change been gradually in progress since then, the last transfer of erty and patients being made to the State by the county lew York, March 1, 1896, the transfer by Kings county ng been made the year previous. Since March 1st, last, State has had entire control of all its insane.

special dispatch to the New York *Tribune*, dated December , ult., from Albany, says: "As showing the effect of this cy two things should be taken into consideration:

First.—The cost of maintaining them.

Second.—Their recovery.

An examination of the workings of these institutions, h are now consolidated under one responsible head, shows t might naturally have been expected, namely, that the of maintaining the institutions has enormously decreased r central management and control, and that the rate of very has constantly risen since this control began. Under nlightened system which now prevails, the best methods, s and policies are substituted for the chaos which formerly ailed."

ll these institutions are under the control of a board of rintendents. The growing tendency in Iowa is to have in y county an insane hospital, independent of and in no way onsible to the State, nor to the State institutions for the ne. These county hospitals are under the stewardship of steward of the county almshouse, and under the profesl care of the county physician, who is often inexperienced physician and especially ignorant in regard to mental and ous diseases—who is too often selected because he is the st bidder for the place, or because of sympathy for him as w beginner, or because of some political influence on his part or on the part of his friends. Would it be surprising this most unfortunate class of all human beings should r such circumstances be deprived of the temporal, moral nedical care so much needed!

these State institutions the diversion and employment of nsane to a safe extent receive practical consideration— extended experience has shown that properly diversified pation that is healthful in character is highly beneficial conducive to permanent recovery.

There is not a shadow of doubt that if one of the intelligent superintendents of our State hospitals should visit the best of our county hospitals a condition of deficiencies and faulty administration would confront him that would indeed be shocking.

The following additional excerpt from the article above referred to is appended:

> All of the insane are now receiving the beneficent care provided by the State. All are provided with suitable diet, sufficient in quality and quantity. All are provided with suitable clothing. All are receiving a high grade of medical care, and all are treated with reference to the possibility of their recovery. The old system of setting aside several thousand as being beyond the pale of recovery has been abandoned in favor of the more enlightened one which provides the benefits which only the State can give. The old horrors, abuses, neglect and ill-treatment which prevailed under the county system have entirely disappeared.

Would it not be well for the thoughtful, intelligent people of Iowa to seriously consider this subject? Would it not be better to profit by the experience of these older States and adopt at once the system that experience has taught to be most economical, humane and helpful to recovery, rather than go back to experiments that have been abandoned after years of faithful trial?

If in populous counties with a large number of insane and ample means to erect suitable buildings and to equip and maintain them in a suitable manner, the plan might seem to commend itself; and yet if the county of New York with its great metropolis and Kings county, N. Y., with its city, Brooklyn, found it a failure, it would seem as if experimentation on the part of any county in Iowa were unwise.

Polk county has made the most liberal provision of any in this State. Unless a special superintendent with capable assistants is put in charge of it, and a system of visitation, and in a sense of general supervision, is had by one or more of the superintendents of the State Hospitals for the Insane there is room for grave apprehensions as to the care and treatment of those who are sent there. The superintendent of the poor farm and the county physician if residing in the city would constitute, if the only persons responsible for the care and treatment of the inmates, a management that would in no way commend itself. If in the hospitals now in operation, and in the one being constructed, the unfortunate insane cannot be comfortably cared for, with the most favorable conditions for their health and recovery, the State, and not the counties, should d others and have all of this class cared for in the best pted buildings, and by the best qualified specialists that be obtained regardless of cost.

ttention is called to the following article upon the subject the *Iowa Medical Journal*, August, 1897.*

n editorial recently appeared in the Des Moines *Leader* on Polk county insane asylum. The article speaks in glowing s of the financial benefits which will accrue to the county aring for its insane in the new building recently erected at poor farm. It extols the system and recommends its adop- by other counties throughout the State, though the build- is barely finished and is untenanted.

he inconsistency of this premature advice reminds one of t was said concerning the committee appointed by the last slature to investigate the State institutions. It was said, ubstance, that these men, some of whom have never made ur of an insane asylum in their lives, would examine the ks, investigate the treatment of the patients, and "suggest hods of improvement to the management"—to men who e devoted nearly a quarter of a century to this work.

his and kindred absurdities simply illustrates the imperfect s prevalent in the popular mind of what constitutes efficient humane care for the insane. It consists of something more furnishing them with a building in which can be provided l, clothing and a bed.

he only motive which permits the erection of county insane lums is the money-saving motive. It does not seem that ument is needed to convince even the most ordinary intelli- ce that the care of insane patients at a county poor farm t of necessity be greatly inferior to that which they now ive.

nd have they been receiving too good care? When we ly the question to ourselves or to members of our own sehold there can be but one answer. This, then, should le the question as to whether the best obtainable is any too d. The county asylum will doubtless be placed under the agement of the poor-farm overseer. His wisdom will ct what has to do with the physical necessities of the ents. He will endeavor to secure for them a general care ch will at least be as good as that bestowed upon the poor.

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y Sara A. Kime, M. D., Des Moines, Iowa, formerly assistant physician to the ital for the Insane, Independence, Iowa.

It will be no better. It is obvious that the insane patients require a very different management from the other inmates of the farm. Their care is a special one, the necessities of which he cannot conceive nor has he the ability to meet.

The medical attendance will no doubt be furnished by the county doctor, whoever he may chance to be, who is generally inexperienced in the care of the insane. It is no exaggeration to say that the best medical practitioner in the State, I care not from what school nor from how many he may have diplomas, is unfit to direct the management of the insane if he is inexperienced in that line.

But how does the county secure the services of a physician? It is done in almost all cases by a system of bidding which awards the contract to the one who places the lowest estimate upon the value of his services. As a medical practitioner he may be competent or he may not be. He contracts to do the work very much below the usual rates for such services, and furnishes his own medicines and appliances. It is unreasonable to suppose that he will give his first and best care to these patients when his private patrons pay him regular fees. When he is busy with private cases, or is out of town on a trip, the poor patients are often placed in the care of a medical student; the private cases, however, are attended by a brother practitioner.

Every now and then we read of some unfortunate poor patient dying as the result of improper medical attention, or for the lack of any. This condition will of course continue so long as the system of bidding is continued. Out of humanity to the poor the system should be abolished. Cheap pay rarely furnishes anything more than cheap services. When we consider that these insane patients, who have been enjoying the best of care in our State institutions under the charge of such experts as Doctors Gilman, Hill and Hoyt, with the most competent assistants, are to be placed under the espionage of an inexperienced poor-farm overseer and county doctor, is it not time to raise a protest against the further establishment of county insane asylums?

In removing the harmless incurables from the State institutions many patients will be found who are capable, under their existing surroundings, of a good degree of self-control. They now live in the best wards of the asylums, where their presence is a positive benefit to the more recent and acute cases. They are quiet, orderly, and industrious and daily manifest their enjoyment of life in a manner that tends to allay suspicion and dispel discontent from the disturbed minds of their associates. Many of these patients when removed from their present supporting influences lose their self-control and become a menace to their associates, or else lapse into a deplorable dementia. To force such a result upon any of these unfortunates is a crime.

There is little doubt but that Polk county will experience the same results from its institution that Linn county has from theirs.

The asylum is located at the poor farm, five or six miles from Des Moines, where the nearest physician resides. The Cedar Rapids *Times* recently said that poor farms are practically poor houses and ought to be called by that name. It declares that the worst mistake that Linn county ever made was when it put twenty thousand dollars into a county insane asylum. It is located five miles from Marion, where the nearest physician resides, and a large number of insane people are kept in it and given poor care and attention.

Not long ago the Ft. Dodge *Messenger* agitated the question in Webster county. It recommended the building of a county asylum and explained in detail how much such a move would save the county. Other counties will also want the same thing. It is to be hoped the experiments in this line already made will be sufficient to convince the people that it is a certain step backward in the care of the insane, and its extension should not be further recommended.

The State of Iowa cannot afford to save money at the expense of this unfortunate class.

VITAL STATISTICS.

As suggested in the last biennial report, the Twenty-Sixth General Assembly made a radical change in the manner of collecting and making the returns of births and deaths.

Instead of requiring these returns to be made by physicians and midwives to the clerk of the district court they are collected by the assessors. The following is the exact language of the Code:

SECTION 2566. It shall be the duty of all assessors, at the time of ing assessment, to obtain and report to the clerk of the district court, blanks adopted by the State Board of Health and furnished by the co auditor, such registration of births and deaths as occur within respective districts for the year ending December 31st immediately ceding.

SECTION 2567. The clerk of the court in each county shall keep a in which shall be recorded all marriages occurring within the co together with such data respecting the same as shall be required by State Board of Health, and shall report to the Secretary of the State B of Health on or before the first day of June in each year such data res ing such marriages for the year ending December 31st immediately ceding. The clerk of the district court of each county shall keep a in which shall be recorded all births and deaths occurring within the co as shown by the returns filed in his office by the assessor, as provide section twenty-five hundred and sixty-six; and on or before the first d June in each year shall furnish to the Secretary of the State Boar Health a report of such births and deaths.

In accordance with the provisions of these sections the S Board of Health, at the annual meeting held May 5, 1 adopted the forms for records of births and deaths as sh on page sixty-six of this report.

Time will demonstrate whether the change has been a one. If the assessors are faithful in collecting, recording, returning these data the record will be more correct numeric than under the former law. Even in this particular, howe there will necessarily be many defects as to the births deaths having occurred during the year, because of change residence, especially because of removals from the State. report however, ought to show the exact number at the when the assessment was made.

From a professional standpoint and as a basis for sani conclusions however, the death reports must always unreliable because of the inaccuracy with which the cause death—the names of the diseases—must of necessity be st

No argument is needed to demonstrate the advantage reliable vital statistics. They constitute the basis for prac sanitary investigation; and for the application of pr restrictive and preventive measures. If such statistics sho an undue mortality from any special disease throughout entire State or in any particular locality, intelligent in could be made as to the cause and the proper remedies be applied intelligently. After the application of restrictive measures subsequent statistics from the same lo ties would demonstrate the efficiency of the methods emplo

In a few years there might thus be demonstrated the par- ılar localities in the State where certain diseases have been, are, most prevalent, and the type of the disease, whether lignant and fatal in character, or whether mild.

Again, statistics showing accurately, or even approximately marriages, births and deaths occurring in the State furnish nparisons between the number of births and deaths, and a respecting the number of births to each marriage, that are only interesting and suggestive, but important.

Michigan has recently enacted a law respecting a registration *leaths* that went into effect August 29, 1897. The features braced in this law have been held and expressed by the ter hereof for some years, viz: That no one should be *rred* within the State without a proper certificate, showing ne, age, cause of death, etc. The practical operation of the thus far as shown by the first Bulletin issued is highly sfactory. It shows returns from over two million sixty-one usand six hundred and sixteen of the total population of the te, leaving less than seven per cent of the State unreported.

The following sections are from the Michigan law referred to:

ECTION 1. *The People of the State of Michigan enact*, That the body of erson whose death occurs in the State shall be interred, deposited in a t or tomb or otherwise disposed of, or removed from the township, ge or city in which the death occurred, until a permit for burial or oval shall have been properly issued by the clerk of the township, ge or city in which the death occurs, who shall be the registrar of hs: *Provided*, That in cities that have, or shall institute, a system of ediate registration of deaths by the Board of Health, the health officer ecretary of the Board of Health shall act as registrar of deaths under act, in lieu of the city clerk, and shall in all respects conform to its isions.

EC. 2. Whenever any person shall die, the undertaker, householder, ive, friend, manager of institution, sexton or other person superintend- he burial of said deceased person, shall cause a certificate of death to lled out with all of the personal and family particulars required in on three of this act, and attested by the signature of a relative or some etent person acquainted with the facts. The physician who attended leceased person during his last illness, shall fill out the medical certifi- of cause of death, which death certificate shall be delivered to the strar within the time designated, if any, by the local board of health. se of death without the attendance of a physician, or if it shall appear able that the deceased person came to his death by unlawful or sus- ous means, then the registrar shall refer the certificate to the health er or coroner for immediate investigation and report prior to issuing permit: *Provided*, That when the health officer is not a physician, and in such case, the registrar is authorized to insert the facts relating to the cause of death from statements of relatives or other competent testimony. Upon the presentation of a certificate of death properly filled out and signed, the registrar shall issue a permit for the burial or removal of the body and shall immediately record the death in the register of deaths, numbering all certificates consecutively in the order in which they are received, beginning with No. 1, for the first death that occurs in each year. In deaths from dangerous communicable diseases, burial or removal permits shall be granted by the registrar only in accordance with the rules of the local board of health and of the State Board of Health relating thereto.

These certificates of death are sent by the registrars or clerks directly to the Secretary of State, and are in the following form:

County.............
Township...........
Village.............
City.................

MICHIGAN.

DEPARTMENT OF STATE—DIVISION OF VITAL STATISTICS.

CERTIFICATE AND RECORD OF DEATH.

REGISTERED NO.
....

Full name.... .... Date of death

MONTH.	DAY.	YEAR.
		189...

Place of death........ Ward ... .St. Sex.... Color ... . ..

Single, married, widowed or divorced ... .

If married, age at (first) marriage ......years.
Parent of ....children, of whom .. .are living.

Age

YEARS.	MONTHS.	DAYS.

Birthplace (State or country) ....

Occupation.......... ....

Name of father .... Birthplace of father (State or country) .....
Maiden name of mother .... Birthplace of mother (State or country) ......

Proposed date of burial or removal..........189..
Proposed place of burial................................
Proposed place of removal...... ....*via* ....
Signature of undertaker .... Address of undertaker ....

CERTIFICATE OF REPORTER.

The personal and family particulars herein given relative to deceased are true to the best of my knowledge and belief. Witness my hand this...........day of... .... 189 ...

(Signature)........................ ....
(Address)...... ....

MEDICAL CERTIFICATE OF CAUSE OF DEATH.

I hereby certify that I attended deceased from.......... ...189... to...........189 .. that I last saw h alive on.......... .. ..189..., that he died on... ....189... about......o'clock, ...M., and that to the best of my knowledge and belief the CAUSE OF DEATH was as hereunder written:

	DURATION OF EACH CAUSE.
Disease causing death*........	....
Immediate cause of death............................ - --	....
Contributory causes or complications, if any............	....

Post mortem............... ....

*In case of A VIOLENT DEATH, state (1) mode of injury and whether accidental, suicidal or homicidal; (2) what was the nature of the injury and the immediate cause of death; (3) contributory causes or conditions, *e. g*, septicemia. Also whether amputation was performed, etc.

Witness my hand this.................... day of...... ... . 189....

Signature of physician, health officer or coroner ....M. D.

(Address)..

'he blank forms for death returns are furnished by the retary of State to the various village and city registrars by them are put into the hands of the undertakers and sex- ;. The registrar is entitled to a fee of twenty-five cents for ı death recorded and reported by him to the Secretary of ;e—except in cities of ten thousand inhabitants and upward re the registrar receives a salary there is no fee for such ›rt.

hese reports are sent monthly to the Secretary of State he compiles and publishes a bulletin monthly showing: e mortality of the State in detail, the prevalence of impor- causes of death, and such other information as shall be of lic interest and sanitary value."* The registrar shall also l a transcript monthly to the clerk of his county containing cord of all of the deaths entered upon his register during preceding calendar month for entry upon the county ›rds of deaths. All certificates of death, local registers, or ıty records authorized under this act or certified copies ·eof shall be *prima facie* evidence in all courts and for all ›oses of the facts recorded therein.

'he act also imposed suitable penalties for refusal or neglect ›mply with its provisions.

'he State Board of Health, while having nothing to do with collection, registration, or publication of the mortuary data ıe State, is greatly interested in the statistics thus obtained, ıuse of the great benefits to be derived from a sanitary dpoint.

›wa, and every State in the Union, will watch the results ıis law with interest, and doubtless with profit.

PREVENTION OF BLINDNESS AND CARE OF INFANTS.

'pon the recommendation of the State Board of Health and ›rs interested in the public health, the Twenty-sixth Gen- Assembly enacted chapter fifty-seven, as follows:

ACT to Prevent Blindness, and for the Care of Infants Affected With isease of the Eyes, and to Provide a Penalty for the Violation Thereof.

Enacted by the General Assembly of the State of Iowa:

ECTION 1. Should one or both eyes of an infant become inflamed or len, or reddened at any time within two weeks after its birth, it shall

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Extract from Sec. 4. Act above referred to.

be the duty of the midwife, parent, guardian, or nurse, or other p having charge of such infant, to report within six hours after disc thereof by such person in charge of such infant, to the health officer or legally qualified medical practitioner of the city, town or district in the parents of the infant reside, the fact that such inflammation or sw or redness of the eyes exists.

SEC. 2. It is hereby made the duty of attending physicians and wives to instruct parents and nurses in regard to the provisions of thi and the danger of sore eyes in infants.

SEC. 3. Any failure to comply with the provisions of this act sh punished by a fine not less than twenty-five dollars nor more than one dred dollars, or imprisonment not to exceed thirty days, or both.

SEC. 4. This act being deemed of immediate importance shall force and take effect on and after its publication.

Though recommended by the Code Commissioners for a tion in the new Code for some reason unknown it was omi It is reasonable to assume that the subject was not consid in all its relations to the public weal or was accidentally looked.

The importance of preventing or at least limiting the nu of cases of blindness needs no argument. If it is a fact every case of blindness is a money loss to the State, it mu true that every case of blindness prevented is a money Hence the effort to prevent this affliction is one of great int to the political economist as well as to the humanitarian.

On this subject three propositions may be stated:

"*First.*—There is in the United States a rapid increase i number of the blind.

"*Second.*—A large percentage of the blindness is due t disease known as purulent ophthalmia of the new born.

"*Third.*—By the use of known methods this could be materially lessened."

BLINDNESS INCREASING.

In proof of the first proposition the census of the U States for 1880 gives the following:

Total population in the United States in 1870 was th eight million five hundred and eighty-eight thousand hundred and seventy-one.

Total number of persons blind in the United States in twenty thousand three hundred and twenty.

The proportion of blind to the entire population in 187 therefore one to nineteen hundred.

The total population of the United States in 1880 was million one hundred and fifty-five thousand seven hundre ty-three, showing an increase in ten years of nearly thirty cent.

he total number of blind persons in the United States in was forty-eight thousand nine hundred and twenty, show- the rate of increase of blindness for the ten years to have one hundred and forty-seven per cent.

his shows that the increase of blindness for the ten years n was one hundred and seventeen per cent greater than increase of population.

he proportion of blind persons to the entire population in was one to ten hundred and twenty-five instead of one to teen hundred as for the year 1870.

hese cold figures are eloquent as well as conclusive.

THALMIA IN THE NEW BORN AS A CAUSE OF BLINDNESS.

support of the second proposition the following facts are n:

ichs found that among three thousand two hundred and four cases of ness collected from asylums in different parts of Europe $23\frac{5}{10}$ per cent due to ophthalmia neonatorum. In the New York Institution for the , at Batavia, $23\frac{4}{10}$ per cent of the inmates are there as the result of the disease.

orner has shown that among one hundred blind asylums in different ries the variation was from twenty to seventy-nine per cent—average -three per cent.

aussmann gives the number in the asylum in Copenhagen made blind is disease eight per cent, in Berlin twenty per cent, in Vienna thirty ent, in Paris forty-five per cent.

cording to the report of the Royal Commission on the Blind, of the sh government, published in 1889, thirty per cent of the inmates of stitutions and seven thousand persons in the United Kingdom have eir sight from this cause. Professor Magnus, of Breslau, finds that an seventy-two per cent of all who become blind during the first year are rendered so by purulent ophthalmia, and shows that of ten thou- hildren under five years of age $4\frac{38}{100}$ are blinded by this disease. In ind asylums of Switzerland the proportion who have lost their sight his disease is twenty-six per cent; in the asylums of Austria, Hungary aly about twenty per cent, while in Spain and Belgium it falls to eleven or twelve per cent. An investigation into the causes of the ness of one hundred and sixty-seven inmates of the Pennsylvania ution for the Blind, made by Dr. George C. Harlan, of Philadelphia, oped the fact that fifty-five owed their affliction to purulent ophthal- nd that more than half of these cases occurred in infancy.

hat produces this ophthalmia? It is clearly an infectious se, and can therefore only occur because the specific on producing it has come into actual, and more or less pro- ed, contact with the conjunctiva.

The disease is caused not only by a secretion from the mother due to gonorrhœa, but may be produced by what is regarded as a simple leucorrhœa; and the infection occurs either during or soon after birth.

If occurring during birth the disease generally manifests itself in the child by redness and puffiness of the eyelids at from the second to the fifth day. It may occur several days later—the infection then being caused by uncleanliness on the part of the hands of, or the sponges or cloths used by the nurse or attendant. Soon after this redness and puffiness appears, if the lids are separated the whole eye-balls will be found bathed in a thick purulent secretion, and unless prompt remedial measures are practiced the sight of the eye is either destroyed or permanently impaired.

MEASURES RECOMMENDED FOR PREVENTING THIS OPHTHALMIA.

The Iowa law above quoted regards the presence of this disease, and the blindness resulting from it, as largely *criminal*. It assumes that the disease, if it does occur, should be promptly recognized and reported, and successfully treated. From the foregoing statement as to the cause, there is indeed no excuse for its existence.

It is a preventable disease, and therefore comes within the purview of legislation for the public good, and the police powers of the State.

LEGISLATIVE SUGGESTIONS.

LOCAL BOARDS OF HEALTH.

There is an ambiguity, indefiniteness and apparent conflict in the provisions of chapter sixteen, title twelve, of the Code which should be removed, and such changes made as will leave no cause for doubt or misunderstanding thereof.

Section five provides that local boards of health "proclaim and establish quarantine against all infectious or contagious diseases dangerous to the public, and maintain and remove the same." It does not declare whether the board shall have authority to do this, or should do so, or whether the mayor or clerk shall do so.

The closing paragraph of the same section provides that the mayor of a city or clerk of a township upon written notice given by any practicing physician of the existence or termination of such disease, may declare or terminate the quarantine, as the case may be.

There is an indefiniteness of expression, if not conflict herein which tends to confusion, and will inevitably result in misunderstanding among local officers. It is also merely directory whereas it should be mandatory. The old law, chapter fifty-nine, laws of 1892, which was substituted for section sixteen, chapter one hundred and fifty-one, laws of 1880, was much better for the purpose intended,—that of suppressing contagious diseases, inasmuch as the original law after faithful trial had been found inefficient and expensive.

This substitute read as follows:

> Upon written notice given by any practicing physician, that small-pox, diphtheria, scarlet fever, or any other contagious disease dangerous to the public health exists in any place, it shall be the duty of the mayor of any incorporated city or town, and the clerk of any district township, forthwith, without other authority, to establish quarantine in such cases * * * and to maintain and remove such quarantine in like manner.

Time is an important factor in suppressing an infectious and contagious disease in a community. A few hours delay may result in the loss of many human lives. In the above given substitute the word "written" should be stricken out.

There is a great tendency for parents and physicians to secrete cases of contagious disease, or to call it by some other name. Suppose a physician refuses to give notice to the proper officers, should the intent and purpose of the statute be frustrated, and the public imperiled? The mayor or township clerk should be directed to act forthwith upon satisfactory evidence that a contagious disease exists in his jurisdiction. If there be a question as to the exact nature of the disease, investigation can be made and if the disease be found not contagious, the quarantine can be released, and no injury is done, whereas, on the contrary, without such summary proceeding irreparable injury may be done, and many lives sacrificed.

Further, under this section five, it is necessary for a local board to be convened in each case of contagious disease within their jurisdiction, in order that the proper order may be made for quarantine, and so decided by the supreme court, which in townships where the members are widely apart, requires lapse of time, frequent failure, and meanwhile many persons ma exposed to the disease.

This provision also involves a needless and unneces expense for frequent meetings of the Board, which is ent avoided by the provisions of the substitute above quoted.

It is suggested that the Code be so changed as to re chapter fifty-nine, laws of 1892, with which local bo throughout the State are familiar, and which, in the delib opinion of the State Board of Health, is most conducive t interests of the public health.

Section seven of this chapter provides that upon the ap ance of small-pox or other contagious disease the local b of health may or may not remove the sick persons to a sep house, or if they cannot be removed they may remain w they are, and necessary nurses, needful assistance and sup be furnished, and such provision made as will best pre the inhabitants against danger. The removal and care o sick is to be effected by an application to a civil magistr the same manner as for the removal of a nuisance, as pro in section six.

The section should be made mandatory. The board shou commanded to act. It is not uncommon that the questi expense of a few dollars outweighs the value of human li

It is only in rare instances—that of small-pox—tha removal of sick persons is required. They can best be for in their homes. The inconsistency, therefore, of requ the warrant of a civil magistrate as authority to enter premises for such public benefaction is plainly apparent.

Section one provides that meetings of the State Boa Health shall be held at the seat of government, and tha Secretary of the Board shall have an office in the Capitol. provision is made as to what shall be furnished such offi the Secretary. After the word "Capitol," in the last should be added the words, "to be furnished with the n sary and suitable furniture, lights and fixtures."

In revising the statute respecting *marriages*, it is provid section 3145, chapter two, title sixteen, that after the mar has been solemnized, the officiating minister or magistrate make return thereof to the clerk of the district court. No of time is fixed for making such return. As the clerks o district court are required to make return to the State Bo Health on or before the 1st day of June of all marriages, deaths filed in his office "for the year ending December immediately preceding," it is important that the returns iade to such clerk with some degree of promptness. The t should be not more than thirty days. The same limit ld be fixed in section 3147, instead of ninety days. There good reason why the return of the marriage to the clerk ie court cannot be made at the time the certificate of mar- e is made for the contracting parties.

INSPECTION OF PETROLEUM PRODUCTS.

hapter eleven, title twelve, of the Code, provides for the ection of petroleum products. In section two thousand five lred and eight it is provided that the lighter products of oleum at a specific gravity of not less than seventy, nor e than seventy-five degrees, when used in the Welsbach ro-carbon incandescent lamp, and for street lighting by et lamps, may be used for illuminating purposes.

'hat was evidently intended as a protective measure, by an rtunate placement of this proviso, becomes practically null, he reason that the lighter products of petroleum of the ific gravity required, which is gasoline, cannot be used for et lighting in street lamps, as it would give no light, pt a blue Bunsen flame. The real intent and purpose was pply the specific gravity to what is used in the Welsbach , and this is really unnecessary for the reason that gasoline ıy other specific gravity or grade cannot be successfully in that lamp.

here are three grades of gasoline used for lighting pur- s. One has a specific gravity of sixty to sixty-five degrees containing a certain portion of carbon, which is made for et lighting.

nother grade is of seventy to seventy-four degrees, which ed for heating purposes in ordinary gasoline stoves, and lluminating purposes in the Welsbach lamp.

nother grade is of eighty to eighty-five degrees gravity, exceedingly volatile, which is used for generating gas in hines outside of buildings and for making gas for gas nes in propelling machinery.

ı all cases there is very little danger of misuse of either, the supply is regulated by the special demand or use to ch it is to be put. It would therefore be well to strike out words relating to specific gravity. If retained it will necessarily require an inspection of all the lighter products of petroleum, the furnishing of special apparatus to all inspectors, at considerable expense, and the exercise of unusual expertness. It will also necessitate the formation of special rules by the State Board of Health for the government of inspectors, for all of which there is no adequate compensation, there being no necessity, direct or implied, for the proviso in the statute.

MINERS' OIL.

The provisions of the Code respecting the use of oil for illuminating coal mines, chapter ten, title twelve, require the mine inspectors to inspect the oil used for illuminating mines.

The schemes and devices of unscrupulous refiners and dealers to evade the statute are numerous and subtle, and so long as they can avoid the suspicion of mine inspectors, their traffic is continued and the miners are supplied with cheap, spurious deleterious, and mixed products, at exorbitant prices.

It would be much better to place the inspection of this oil entirely with the oil inspectors, and prohibit the sale or use of any oil for illuminating mines that has not been inspected, and does not bear the brand of approval of such inspector. This would put a stop to all illicit traffic and protect the miners not only from spurious and adulterated oil, but from the extortions practiced by mine operators' stores, which are the agencies of these unscrupulous dealers. See page 331.

TABLE I. METEOROLOGICAL TABLES—COMPARATIVE STATEMENTS.

1839—IOWA CITY*—1859.

Elevation above sea level, 645 feet.

YEARS.	COMPARATIVE MEAN TEMPERATURE (DEGREES). June	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean for year.	COMPARATIVE PRECIPITATION (INCHES). June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for year.
1839	70.6	75.7	73.1	61.1	60.7	35.1	23.9	32.2	31.8	40.5	62.7	68.9	53.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1840	72.4	73.9	72.1	63.1	52.6	41.9	29.6	19.5	28.2	38.3	52.9	63.1	50.64	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1841	71.1	70.4	65.5	58.5	55.0	38.2	28.8	20.9	26.1	37.1	51.0	58.1	48.68	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1842	65.6	68.4	68.7	64.5	55.5	30.2	21.6	26.3	28.1	45.8	53.3	57.9	48.82	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1843	67.8	70.4	70.6	64.6	42.2	34.1	31.9	25.0	13.4	15.5	47.7	58.2	45.11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1844	65.8	74.9	70.0	61.4	46.1	36.1	25.4	23.7	30.3	38.3	60.8	55.9	48.81	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1845	64.3	76.0	70.8	62.9	48.5	33.3	18.2	30.0	29.9	40.4	51.1	55.5	48.39	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1846	66.1	73.0	72.0	65.9	43.0	39.1	28.9	31.2	24.2	40.6	52.7	64.1	50.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1847	63.5	69.5	65.3	59.8	47.8	33.5	25.4	12.3	25.3	29.4	49.1	55.8	44.64	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1848	64.3	64.0	66.7	56.3	43.9	30.8	19.1	28.0	28.4	35.2	45.1	62.0	45.31	2.50	5.70	9.10	3.00	4.30	1.40	1.29	1.20	1.60	2.10	0.70	4.40	36.29
1849	67.6	66.5	65.3	61.7	49.0	42.9	18.4	14.3	18.1	37.6	44.3	54.8	45.00	12.20	1.40	12.20	5.00	4.80	6.60	1.14	2.82	1.30	2.41	4.70	4.70	59.27
1850	70.2	74.2	72.2	58.8	44.2	37.6	19.8	24.4	28.9	32.6	41.2	53.3	44.76	3.50	5.00	13.00	3.90	2.70	3.59	2.87	4.62	0.80	2.08	3.30	3.70	38.66
1851	46.6	71.6	69.1	68.3	50.4	34.5	21.4	24.0	27.7	38.2	43.5	58.2	46.12	14.30	8.60	14.00	3.50	1.40	3.63	2.95	1.55	5.34	3.03	3.60	12.60	74.50
1852	66.8	72.4	69.0	59.8	53.2	30.0	22.2	19.6	29.0	36.2	32.2	60.0	45.86	2.20	3.70	2.80	8.30	7.60	5.76	5.11	2.52	1.00	8.60	5.30	6.50	59.39
1853	71.2	68.8	71.1	62.2	45.5	39.7	26.7	27.1	23.4	33.2	47.8	55.7	47.36	6.40	6.60	1.70	6.20	0.21	4.92	0.32	0.43	0.90	0.76	11.80	4.60	45.08
1854	69.0	76.2	73.0	68.2	44.4	36.8	27.8	16.2	28.5	39.9	51.1	60.0	41.00	0.66	2.22	3.33	1.13	4.22	0.19	0.51	0.40	1.80	1.22	1.76	6.21	24.15
1855	67.0	73.0	70.4	67.9	47.2	37.8	21.7	24.8	15.6	30.3	54.0	60.4	47.50	4.75	2.35	3.51	1.84	2.86	2.18	2.15	1.68	0.70	1.87	2.55	1.94	28.68
1856	71.8	73.5	65.4	59.0	52.4	32.8	15.6	7.5	15.0	25.8	49.5	61.4	44.14	2.86	2.74	1.36	2.45	5.21	4.35	6.25	0.12	4.46	0.57	3.44	4.39	38.20
1857	65.1	71.2	70.9	63.8	47.9	31.2	31.4	6.2	28.8	29.9	38.3	53.9	44.90	0.90	4.67	6.00	1.80	1.95	4.77	1.85	0.61	5.80	3.33	5.09	2.75	39.52
1858	70.6	78.8	79.8	66.0	52.0	32.6	25.5	30.0	16.0	38.7	46.1	54.3	49.20	6.70	7.30	4.12	6.10	4.90	4.54	1.82	1.60	2.00	2.20	2.00	8.40	61.68
1859	69.0	72.3	68.2	60.3	37.5	39.6	15.1	24.1	25.8	40.1	48.3	62.1	46.45	5.82	2.93	1.70	1.80	0.85	1.33	1.81	0.94	1.72	5.01	1.05	7.49	32.70

*Observations were made by Prof. T. S. Parvin.

TABLE II. METEOROLOGICAL TABLES—CONTINUED.

1859—MUSCATINE*—1874.

Elevation above sea level, 520 feet.

YEARS.	COMPARATIVE MEAN TEMPERATURE (DEGREES).													COMPARATIVE PRECIPITATION (INCHES).												
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean for year.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for year.
1860	69.3	71.7	68.06	54.3	61.3	35.7	17.5	21.3	26.6	42.7	49.6	64.3	47.90	3.66	4.03	2.30	2.76	1.00	2.09	4.02	1.17	0.43	0.55	1.67	1.42	25.10
1861	68.3	69.0	70.1	62.6	50.1	37.0	28.0	13.9	27.1	34.0	47.6	58.7	46.28	0.40	2.70	1.07	9.92	9.16	2.93	2.87	0.28	3.91	2.30	4.40	2.98	46.09
1862	71.8	73.4	69.3	63.4	48.6	35.2	29.3	13.5	13.2	29.0	42.9	59.4	45.91	6.07	3.10	7.30	6.10	2.49	3.29	2.75	0.29	0.38	4.06	5.39	3.66	47.78
1863	62.5	71.5	70.4	61.2	40.0	33.8	77.0	26.0	23.4	31.9	48.3	58.7	41.63	0.21	0.80	2.44	4.44	4.10	4.11	8.55	8.40	3.02	2.58	0.55	4.56	33.76
1864	70.6	76.0	73.0	66.9	47.8	45.8	19.3	15.9	27.4	32.6	46.1	66.2	46.95	5.70	5.00	7.60	2.12	4.55	4.82	1.60	2.30	0.67	5.64	3.97	8.60	47.47
1865	74.9	69.3	72.4	72.6	53.9	42.6	21.0	20.5	31.5	34.3	42.1	61.4	50.20	6.99	7.30	1.55	3.75	6.35	0.25	0.83	0.30	3.15	3.57	9.31	2.72	45.34
1866	67.9	77.1	68.8	59.1	53.1	40.2	23.6	20.7	19.6	31.3	51.2	59.2	47.65	4.76	6.55	6.85	6.53	4.61	1.41	2.34	4.19	0.79	0.83	2.92	1.59	43.87
1867	70.5	73.3	74.7	66.8	54.5	31.6	24.3	17.9	26.3	25.7	47.1	51.9	47.00	3.94	3.91	4.45	4.62	3.06	1.97	0.73	1.26	4.76	1.90	0.95	10.60	42.18
1868	70.8	80.8	69.1	58.8	49.8	38.0	21.7	13.4	25.3	42.7	41.7	61.7	48.11	1.28	6.15	4.67	5.17	0.33	4.38	0.81	0.17	1.51	6.31	4.92	6.20	43.90
1869	66.0	70.9	74.4	63.2	42.7	32.1	25.5	26.0	27.0	30.4	47.1	60.0	47.11	7.42	7.42	11.43	3.09	2.07	3.52	2.40	1.56	2.65	0.43	3.16	4.06	49.11
1870	71.8	78.8	70.9	67.8	53.2	29.3	24.4	22.1	24.9	30.8	53.5	65.5	50.20	1.30	1.85	5.83	6.67	3.16	0.44	0.25	2.30	0.25	2.30	0.25	3.00	28.10
1871	70.5	71.3	73.8	60.1	52.8	29.0	15.6	22.1	26.2	42.8	.....	65.9	.....	9.16	5.56	5.23	0.00	5.51	3.77	2.18	1.51	3.10	5.36	3.30	2.00	66.63
1872	70.5	74.0	73.8	62.9	48.1	27.3	12.6	16.9	23.2	28.3	48.8	58.6	48.75	7.39	5.85	9.55	6.29	0,80	1.21	0.71	.....	0.24	.....	.....	7.82	......
1873	73,5	73.5	74.8	61.1	44.9	31.4	25.1	10.4	16.4	31.5	44.2	56.2	45.25	4.44	3.24	0.65	2.97	2.96	0.82	4.22	.....	.30	.....	.....	5.55	......
1874							.....	....	....	42.8	52.1	.....	......	.....	.....	.....	...	.....			.....	......	......	......	......	

*Observations were made by Prof. T. S. Parvin.

TABLE III. METEOROLOGICAL TABLES—CONTINUED.

1885—CEDAR RAPIDS—1897.

Elevation above sea level, 736 feet.

YEAR	COMPARATIVE MEAN TEMPERATURE (DEGREES).													COMPARATIVE PRECIPITATION (INCHES).												
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean for year.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for year.
1885..	67.56	93 92	66.15	58.29	45.04	35.55	23.07	7.41	10 06	28.07	45.21	55.58	44 68	3.45	6.43	6.38	2.84	2.50	0.65	2.48	1 65	1.85	0.61	7.82	5.62	42.28
1886..	71 11	77.23	78.53	64.10	53.58	33.55	16 50	10.80	21.66	28.70	51.54	62 50	47.48	1.25	0.57	1.70	2 86	4 92	1.50	0.40	2 60	1 27	4 47	2.16	2 69	26.39
1887..	74.08	77 80	73 40	63 30	45 51	34.25	23.70	18 52	16.08	31.75	49.53	66.27	45.59	2 53	4.58	1 40	4 93	2.07	0.79	2.72	2 05	4.67	3.50	0.98	1.20	31.41
1888..	69 80	75.96	68 10	58 60	47 80	36.50	28.90	9 18	20 60	27 80	48.55	52.83	45 56	2 29	6 03	2.42	1.07	2.85	4.12	2 16	1.39	1.87	3.53	1.74	3.10	36.56
1889..	65 27	74 30	71.20	60.66	46 74	35.06	33.42	22.40	19.96	39.30	47.80	57.59	48 21	4.11	5.79	1.65	3.70	1.49	1.03	1.63	1.44	1.87	0 42	2.91	5.15	31.18
1890..	74 23	75.53	67 83	59 56	46.18	39.30	29.10	23 33	28.72	29 04	52.25	60 63	48.79	9.54	1.97	4 27	2.90	5 30	1 87	0 40	2.11	1 04	2.04	2.42	2.06	35 92
1891..	69 27	70.42	69 82	67 63	49 18	35.21	32 75	26.00	23 27	24.06	51.83	71.51	48.40	3.21	3.20	5.44	1.81	2.44	2.98	1.77	1.80	1.13	3.74	1.63	4.11	33.25
1892..	71.08	73 07	75 04	67 04	55 06	33.06	19.07	15.02	30.08	32 05	46.06	55 93	48 00	7.48	4.45	2 07	2 33	1 03	1.60	2 02	2.82	2 18	2.38	4.15	10.12	42.63
1893..	72.20	76.03	70 02	64.09	52.07	34.03	22.09	9 03	17.04	33.01	45.09	57 02	46.04	4 80	1 98	2 47	2.85	2.63	1.24	2.40	0.72	1.82	2.99	3 80	2.79	30 67
1894..	74.04	76 01	74.07	65 03	52.02	34.00	32.06	21.09	20.09	42.05	53 02	61.06	50.38	2.43	0 18	2 51	1.48	2.23	1.53	1.39	1.51	1.58	4.53	1.65	3.08	23 69
1895..	72.06	74.03	75 00	70.00	46.00	35.00	27.00	14 08	16.08	36.00	53.08	63 00	48.08	2.23	3 22	1 50	3.64	1.23	1 83	2 90	1.56	0.58	0.60	1 26	2.84	23.39
1896..	73 02	73 02	73.08	59.01	47.06	31.07	30.03	25.00	26.08	33.07	59 02	60 08	41.03	1.91	6.50	2.40	3.18	2.76	1 61	0.85	0.27	0.48	0.50	5.23	3.99	29.77
1897..	68 60	76.40	.....	....	......	.....	......	17 01	24.05	32.07	47.04	58.00	.....	3.96	4.35	.....	....	.....	.....	.. .	1.99	0.71	1.18	5 97	2.10	.....

TABLE IV.

METEOROLOGICAL TABLES—CONTINUED.

1874—DAVENPORT—1897.

Lat., 41° 30′ N.; Long., 90° 30′ W. Elevation above sea level, 585 feet.

YEARS.	COMPARATIVE MEAN TEMPERATURE (DEGREES).													COMPARATIVE PRECIPITATION (INCHES).												
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean for year.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for year.
1874	72.6	77.5	74.3	65.1	52.3	36.3	27.9	23.8	25.9	34.3	41.2	64.3	49.63	5.37	3.10	3.68	7.86	1.30	2.47	0.50	4.34	0.74	1.34	2.64	3.45	36.79
1875	68.4	73.6	69.3	61.7	48.6	33.4	34.5	9.4	10.4	30.1	45.7	60.5	44.96	4.91	9.36	1.73	4.05	1.63	0.57	3.08	0.38	1.09	0.88	2.30	2.01	27.99
1876	69.0	75.4	74.6	62.5	49.2	35.2	14.4	29.9	30.1	32.1	56.0	62.1	49.20	4.25	4.82	4.27	5.50	1.54	2.54	0.36	3.47	3.63	4.34	5.39	6.70	46.89
1877	69.1	75.0	72.5	67.1	53.5	37.1	42.5	16.8	36.3	28.7	49.4	61.6	50.80	5.80	3.43	3.21	1.45	4.88	2.53	2.32	1.41	0.70	3.91	3.28	2.82	35.09
1878	68.0	78.0	74.0	65.1	51.8	42.3	20.3	30.1	36.7	48.2	60.7	57.5	51.22	4.36	2.19	5.07	1.82	4.21	0.90	0.98	0.36	1.00	2.21	2.89	5.14	31.12
1879	69.5	76.9	71.7	60.5	59.8	39.9	30.8	18.4	25.5	39.5	50.5	63.8	50.56	4.57	5.87	4.33	1.43	0.92	4.70	1.02	0.75	1.09	1.80	1.54	5.83	33.80
1880	72.2	64.5	74.5	62.8	50.7	30.7	21.7	37.6	33.7	37.0	49.7	67.2	51.03	7.21	4.31	5.99	4.87	0.94	1.23	1.15	3.13	1.72	2.68	4.50	5.09	42.73
1881	69.7	77.6	77.2	69.7	56.5	39.7	38.2	13.8	19.9	28.8	41.6	69.0	50.39	7.94	0.91	0.73	5.59	6.85	2.19	1.71	1.34	4.14	3.33	1.61	1.84	37.68
1882	64.6	70.5	72.2	64.4	57.7	42.2	28.2	28.9	40.3	40.3	51.3	55.6	51.76	8.53	4.41	2.29	1.30	3.75	1.49	1.78	0.90	0.62	2.80	3.15	5.49	38.50
1883	68.3	73.7	69.8	60.9	50.9	41.7	31.3	16.5	24.4	34.7	51.7	57.0	48.32	4.88	3.66	1.02	0.72	5.13	3.58	6.79	1.16	4.42	0.73	3.33	5.46	35.33
1884	70.3	71.8	70.0	69.5	57.2	40.3	25.1	18.8	26.9	36.4	50.4	61.2	48.72	3.07	4.51	3.84	4.79	7.17	1.49	3.68	0.75	0.98	3.97	0.77	3.79	38.11
1885	68.2	75.5	67.9	66.1	48.1	33.1	25.6	15.9	17.3	34.3	49.4	57.8	45.01	2.08	1.86	12.64	4.19	2.71	1.20	1.95	3.10	1.20	0.17	2.47	1.96	34.35
1886	70.2	76.3	74.4	65.4	55.7	35.1	17.5	13.8	23.4	33.0	52.0	62.4	47.90	0.49	0.43	2.67	2.43	3.47	0.74	0.53	2.22	1.52	3.08	1.84	3.73	23.62
1887	73.0	78.0	72.2	64.4	47.5	37.0	24.0	13.2	23.8	34.3	52.3	67.1	48.90	1.43	4.87	3.23	5.45	3.41	1.13	3.26	1.43	4.87	0.77	1.17	1.76	33.78
1888	69.6	74.4	69.6	58.0	46.9	33.1	30.5	9.7	20.8	30.1	49.5	55.2	46.29	3.83	7.31	2.79	1.38	2.81	3.54	2.59	1.54	1.17	2.70	1.57	9.23	40.46
1889	69.7	73.8	72.1	62.8	49.0	36.6	39.6	25.2	19.0	39.3	49.7	59.3	48.67	5.59	8.25	1.11	3.27	1.26	2.17	1.60	0.95	1.44	1.74	3.89	6.34	37.61
1890	74.0	76.0	70.0	61.8	53.0	42.0	30.4	27.0	31.0	30.0	53.0	58.0	49.68	4.51	0.85	1.66	2.34	3.63	1.37	0.62	2.49	1.10	2.34	0.76	4.33	24.50
1891	71.0	69.0	70.0	69.7	51.0	32.0	35.0	23.0	26.0	29.0	52.0	58.0	49.60	3.56	3.29	5.54	1.50	1.87	3.56	1.64	2.38	0.89	1.68	3.30	2.74	30.95
1892	70.0	74.0	73.0	66.0	56.0	33.0	20.4	17.0	31.0	34.0	47.0	56.0	48.10	10.79	4.16	1.63	2.09	0.55	2.01	2.73	1.60	1.38	3.06	5.41	3.84	44.15
1893	72.0	77.0	72.0	66.0	55.0	36.0	24.0	9.0	17.0	31.0	47.0	58.0	47.04	3.82	1.75	1.12	3.36	0.30	2.56	1.67	1.14	1.69	2.25	4.50	2.67	27.33
1894	75.0	77.0	75.0	67.0	54.0	34.0	32.0	24.0	22.0	43.0	53.9	61.0	41.03	2.16	0.44	2.02	1.02	3.02	1.26	0.61	1.33	4.48	1.88	1.87	1.93	18.52
1895	73.0	73.0	75.0	69.0	46.0	35.0	27.0	15.0	15.0	35.0	53.0	63.0	48.08	1.22	5.16	4.79	1.30	0.81	2.50	2.54	1.27	0.38	1.57	0.38	2.25	27.14
1896	70.7	74.6	73.1	60.6	49.8	35.8	32.8	26.6	26.7	33.0	57.1	68.4	50.08	2.28	5.64	3.12	3.96	1.67	0.08	0.65	0.89	1.45	0.84	3.41	4.03	28.68
1897	70.0	70.4	.....	.....	.....	.....	.....	20.8	23.0	25.2	49.0	59.6	......	1.87	3.21	......	.....	.....	.....	.....	3.58	1.57	2.82	3.69	1.91	......

TABLE V. METEOROLOGICAL TABLES—CONTINUED.

1878—DES MOINES—1897.

Lat., 41° 35′ N.; Long., 90° 40′ W. Elevation above sea level, 849 feet.

YEARS.	COMPARATIVE MEAN TEMPERATURE (DEGREES).													COMPARATIVE PRECIPITATION (INCHES).												
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean for year.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for year.
1878	.....	.....	78.0	68.1	50.4	42.2	19.9	.....	.....	.....	.....	.....	.....	.....	.....	2.21	2.00	2.84	0.84	1.75	.....	.....	.....	.....	.....	.....
1879	70.1	77.7	73.4	60.4	69.7	39.3	21.4	18.7	39.9	39.9	51.2	64.2	51.32	6.69	0.29	1.98	2.79	3.15	5.49	1.39	0.69	1.68	1.68	1.03	4.74	32.60
1880	71.8	74.4	73.1	62.2	49.2	28.2	20.1	33.2	38.0	38.0	50.5	68.5	51.01	4.11	3.82	6.69	5.34	4.90	1.97	0.86	0.78	0.70	0.70	1.56	5.84	37.22
1881	70.6	76.2	77.9	66.2	54.7	35.8	35.0	14.0	28.9	28.9	43.4	66.8	49.86	15.79	5.57	5.29	4.70	6.45	3.97	1.85	1.55	1.78	1.78	3.36	3.82	55.91
1882	67.9	68.4	71.1	94.2	55.4	39.3	23.9	26.7	37.8	37.8	51.1	54.8	52.86	13.16	4.78	3.14	0.15	5.94	2.81	2.50	0.63	2.28	2.28	3.47	3.58	48.67
1883	67.5	73.6	79.7	59.8	48.7	48.7	27.3	8.8	19.1	32.9	51.8	55.8	46.93	7.75	2.37	2.83	1.88	4.42	4.43	1.08	1.72	2.51	0.57	3.48	9.76	41.79
1884	70.0	71.8	68.7	67.9	55.6	37.6	18.4	16.0	21.5	33.8	41.7	59.5	46.90	3.84	2.16	3.84	5.46	5.33	1.26	1.93	0.85	0.04	2.24	2.97	3.34	34.28
1885	69.0	75.9	68.7	63.5	48.8	39.2	28.4	11.5	14.6	36.6	49.0	59.1	46.65	5.03	6.55	5.10	4.82	4.17	0.61	1.96	1.00	0.42	0.04	3.62	1.70	35.02
1886	71.3	78.4	76.8	65.1	57.3	35.8	19.2	10.9	24.8	34.9	52.7	64.4	49.67	1.21	0.27	1.10	7.90	2.62	1.86	0.81	3.44	0.52	1.41	4.32	3.71	29.17
1887	71.9	77.5	72.4	68.8	48.4	37.3	22.9	11.5	19.4	35.7	52.5	65.7	48.25	2.25	1.97	2.66	5.36	1.40	0.62	1.41	0.83	1.65	1.79	2.48	2.31	24.63
1888	68.6	76.6	69.2	58.3	46.8	35.8	29.1	6.9	22.6	29.0	51.0	54.5	45.61	2.32	3.42	4.52	0.43	0.84	2.09	2.44	1.15	1.51	3.09	1.45	7.84	31.15
1889	67.4	73.8	72.0	62.8	49.2	34.4	39.5	21.8	19.6	39.2	50.1	60.5	49.22	2.32	4.37	2.25	3.41	0.52	1.29	0.57	1.22	0.27	0.11	2.66	4.84	24.18
1890	73.1	76.9	69.6	61.0	51.5	41.2	32.3	20.6	27.0	29.6	52.8	58.4	49.50	4.91	1.10	3.85	1.57	4.48	0.74	0.11	2.62	1.17	0.91	0.78	3.00	25.12
1891	69.3	68.6	69.8	68.2	52.3	32.0	34.6	28.3	23.2	28.8	52.0	57.8	48.78	5.60	2.78	4.22	1.64	2.41	1.34	1.54	1.82	1.13	2.25	2.13	3.29	30.14
1892	69.0	73.8	72.0	65.8	55.2	36.7	19.6	17.8	29.0	33.6	47.0	54.8	47.85	3.41	8.64	2.45	1.12	2.54	1.58	1.95	1.60	1.85	2.47	3.36	8.77	39.24
1893	71.0	76.0	70.0	66.0	55.0	36.0	23.0	10.2	17.0	33.0	46.0	57.0	47.50	4.69	3.55	1.60	1.33	0.22	1.23	1.30	0.56	1.28	1.15	5.61	2.84	25.36
1894	74.0	78.0	76.0	67.0	54.0	34.0	33.0	21.0	20.0	43.0	53.0	62.0	51.00	1.67	0.29	1.89	4.46	2.24	0.99	1.15	1.09	1.39	1.78	1.70	1.41	20.56
1895	70.0	73.0	74.0	69.0	48.0	36.0	27.0	17.0	19.0	36.0	55.0	68.0	48.09	5.26	3.10	3.57	3.20	0.29	0.85	1.86	1.30	0.60	0.50	3.41	2.86	26.80
1896	70.1	73.0	73.0	60.0	51.0	32.0	34.0	25.0	30.0	32.0	56.0	66.5	50.08	2.69	3.15	5.49	3.61	2.69	1.01	0.85	0.60	0.79	1.24	3.47	6.50	30.90
1897	70.1	76.5	.....	.....	.....	.....	.....	20.0	26.0	35.0	49.0	60.0	.....	3.15	2.88	.....	.....	.....	.....	.....	2.02	0.71	2.13	7.37	2.31	.....

TABLES VI. METEOROLOGICAL TABLES—CONTINUED.

1874—DUBUQUE—1897.

Lat., 42° 30′ N.; Long., 90° 33′ W. Elevation above sea level, 665 feet.

YEARS.	COMPARATIVE MEAN TEMPERATURE (DEGREES).													COMPARATIVE PRECIPITATION (INCHES).												
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean for year.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for year.
1874........	72.5	78.3	74.3	65.2	52.0	34.4	29.6	21.2	23.2	33.2	41.8	65.2	40.86	3.30	3.34	2.18	7.68	2.14	4.17	0.65	2.45	0.36	1.28	1.54	1.08	30.12
1875........	67.5	73.3	69.7	61.7	52.1	33.7	33.9	6.6	6.1	27.5	45.0	69.7	44.85	4.75	5.39	1.07	6.11	2.71	0.48	2.71	1.00	2.12	1.45	2.71	3.62	35.12
1876........	69.1	74.9	73.8	61.4	47.6	34.1	13.7	27.8	27.8	31.0	48.6	61.6	47.61	7.88	8.15	5.92	5.00	1.10	2.49	0.52	3.20	1.53	4.00	3.63	5.96	50.28
1877........	67.4	74.7	73.0	66.2	51.7	35.0	46.0	15.2	34.8	27.1	48.2	62.2	50.15	6.75	2.90	3.96	0.67	5.85	3.31	2.70	0.96	0.26	4.53	3.74	3.84	38.07
1878........	66.8	76.8	76.7	63.8	49.9	39.7	19.5	27.7	36.8	45.4	53.6	56.0	50.60	4.35	6.71	1.72	6.94	2.85	0.76	1.12	0.49	0.98	2.44	4.34	4.61	38.26
1879........	68.9	76.6	71.6	59.4	58.7	37.4	20.8	17.4	22.8	37.2	50.7	62.6	48.61	4.99	6.78	2.43	2.98	0.93	5.41	1.28	0.44	1.00	1.20	1.02	2.94	22.51
1880........	71.1	74.2	72.8	61.2	48.7	27.8	19.1	34.4	29.1	35.6	48.8	67.4	49.76	6.02	3.55	7.15	6.84	0.66	2.11	1.25	1.95	1.01	2.55	3.52	3.72	31.54
1881........	67.6	75.2	74.5	66.3	53.8	36.2	34.7	12.5	20.1	30.4	43.9	67.7	48.53	7.56	10.58	2.46	10.26	6.70	3.19	1.55	1.87	3.70	3.70	1.30	2.20	42.40
1882........	67.2	69.0	71.6	62.6	55.3	39.2	23.4	24.1	35.7	37.0	48.5	54.4	49.00	6.29	1.48	2.29	2.60	5.29	1.55	1.79	0.84	0.59	1.49	4.47	4.16	41.18
1883........	67.7	72.5	68.5	58.8	53.3	38.5	27.0	10.2	18.8	30.9	49.7	54.6	45.68	5.34	7.90	2.70	2.09	4.44	1.65	1.88	1.59	2.60	0.32	1.93	7.10	39.65
1884.......	68.6	80.0	68.4	67.8	53.6	36.3	21.3	14.1	22.2	32.2	48.4	60.6	46.96	4.89	5.30	4.25	4.07	4.16	1.43	4.08	0.99	2.19	3.85	2.77	4.88	31.98
1885........	69.0	75.9	68.8	63.5	55.1	39.2	28.4	12.3	13.3	30.8	47.2	56.7	46.69	6.16	6.16	3.07	4.58	2.30	0.64	3.14	1.80	0.72	0.41	3.69	2.62	34.41
1886........	71.3	78.4	76.8	65.1	48.8	35.8	19.2	10.9	21.8	31.3	51.0	61.1	48.70	0.71	0.89	0.67	3.10	4.08	1.30	1.08	3.17	1.56	4.32	2.12	4.17	29.66
1887........	71.9	77.5	73.2	71.0	46.8	25.0	22.9	11.5	20.7	32.4	50.7	66.6	49.59	1.82	2.44	4.40	7.72	2.22	0.74	3.07	3.33	3.56	1.80	1.27	2.53	32.50
1888........	69.0	74.1	69.0	57.0	46.0	37.0	29.0	7.0	18.0	26.7	48.0	58.9	44.55	5.28	3.59	1.73	2.01	1.62	2.75	1.96	1.20	1.31	3.44	2.58	5.81	32.91
1889........	66.0	73.0	72.0	63.0	48.0	35.0	37.0	22.0	16.0	39.0	49.0	59.0	49.06	3.87	4.22	0.26	1.54	0.66	1.51	1.88	1.55	1.34	0.30	3.56	4.00	24.18
1890........	74.0	75.0	68.8	60.0	51.0	39.9	27.0	23.0	28.6	28.0	51.0	56.0	48.42	9.59	1.21	6.00	3.72	6.43	1.85	0.82	2.31	1.25	1.68	2.94	5.36	40.26
1891.......	70.0	69.0	70.2	69.0	51.1	36.6	33.0	26.8	23.1	27.7	50.8	58.2	48.10	2.24	4.59	3.31	0.68	2.20	3.24	2.08	1.27	0.98	2.09	1.63	2.54	26.55
1892........	68.0	74.2	72.6	64.2	54.6	31.4	17.9	14.6	28.6	31.0	45.7	55.0	45.40	14.16	5.08	2.51	3.79	0.44	1.89	2.08	2.84	1.02	1.91	4.37	9.18	40.60
1893........	72.0	76.0	71.0	64.0	53.0	34.6	22.0	6.6	15.0	33.0	45.0	57.0	45.68	5.49	5.57	0.58	3.31	1.66	2.08	1.33	1.60	1.30	2.52	4.33	3.06	32.77
1894........	75.0	76.0	73.0	66.0	52.0	32.0	32.0	23.0	20.0	41.0	52.0	62.0	50.30	2.25	0.02	1.38	2.96	1.39	1.53	0.35	1.11	1.29	3.06	2.26	1.75	19.28
1895........	72.7	74.0	74.0	70.0	48.0	36.0	28.0	14.0	16.9	35.5	53.9	62.1	48.70	2.23	3.00	1.75	2.06	0.80	2.12	2.75	1.44	0.66	0.99	0.49	2.68	19.74
1896........	71.0	73.8	72.6	59.6	67.48	33.00	20.5	24.0	27.1	31.1	54.7	63.2	49.60	3.11	7.72	2.05	5.67	2.56	1.60	0.71	0.75	1.98	0.76	7.80	7.63	42.26
1897........	68.2	76.0	.....	.....	.....	....	.....	17.09	24.9	32.4	47.6	58.7	.....	2.36	4.84	.....	......	.....	....	.....	2.55	1.43	2.97	3.39	2.09	......

TABLE VII. METEOROLOGICAL TABLES—CONTINUED.

1874- KEOKUK—1897.

YEARS.	COMPARATIVE MEAN TEMPERATURE (DEGREES).													COMPARATIVE PRECIPITATION (INCHES).												
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean for year.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for year.
1874...........	75.5	80.4	76.7	67.0	55.4	36.7	31.2	27.7	29.4	38.0	44.0	66.7	51.30	4.01	4.61	3.87	7.92	1.84	2.17	1.26	3.83	0.88	0.14	2.40	1.65	34.77
1875...........	71.0	75.5	70.3	68.8	50.6	35.1	6.5	16.3	18.1	33.8	48.9	61.8	48.50	3.33	12.70	3.83	5.30	2.71	0.59	3.93	0.61	1.84	1.67	0.89	6.70	48.10
1876...........	69.7	76.4	75.8	64.4	51.8	36.2	18.8	23.8	34.2	31.6	52.6	63.5	50.31	6.61	6.79	4.13	11.06	2.12	2.82	0.23	3.68	1.45	3.45	4.07	5.26	31.71
1877...........	71.4	76.9	74.3	69.8	55.3	38.9	41.9	22.0	38.0	33.5	50.7	53.1	53.90	7.82	6.90	2.52	3.61	7.01	3.05	3.90	0.51	0.15	3.76	4.22	5.55	49.19
1878...........	70.6	81.5	77.7	67.3	51.8	44.0	23.8	34.9	38.4	50.4	58.8	60.2	55.17	3.93	2.37	5.27	1.36	2.81	1.93	1.95	0.16	2.95	3.78	2.31	3.47	31.78
1879...........	72.1	80.6	75.0	62.9	61.4	42.7	26.9	23.6	29.8	42.8	53.2	66.8	52.99	2.43	1.98	4.57	1.12	0.23	3.91	1.45	0.50	0.53	1.72	1.55	1.46	22.51
1880...........	73.9	77.7	77.5	65.4	51.2	31.5	24.1	41.3	36.3	40.0	53.8	68.9	53.46	3.06	2.25	3.81	3.21	2.02	1.13	0.67	3.91	1.94	1.83	4.79	5.94	34.84
1881...........	73.7	79.9	70.2	72.4	57.0	39.6	37.6	18.8	24.9	33.7	46.8	69.8	51.95	3.70	3.06	0.86	4.10	3.01	2.59	1.70	0.50	2.58	2.42	3.42	6.65	42.40
1882...........	71.1	72.4	73.4	66.1	58.6	42.8	27.7	28.1	39.5	41.7	53.7	56.8	52.64	9.44	4.53	3.99	2.52	2.71	2.25	1.75	1.07	1.54	3.30	3.22	7.11	41.53
1883...........	69.7	76.0	71.2	62.7	51.5	42.8	31.8	15.5	24.9	35.3	54.0	59.8	49.30	5.88	3.15	1.34	1.76	6.95	2.09	1.20	1.24	6.13	1.07	2.97	4.87	38.65
1884...........	71.5	75.0	73.0	71.1	58.4	40.6	23.0	18.7	27.5	37.3	50.6	62.3	50.66	4.03	2.30	2.74	4.25	3.35	1.73	3.91	0.85	1.88	3.37	1.31	3.16	31.98
1885...........	70.4	78.5	70.0	64.6	49.4	40.6	28.7	16.3	16.4	34.7	49.7	60.6	48.31	6.97	2.29	5.98	3.77	2.59	0.88	1.96	2.44	1.14	0.17	2.23	2.59	34.11
1886...........	76.7	77.5	77.1	68.2	57.6	38.5	21.3	14.7	26.2	26.5	53.6	64.1	49.61	2.86	0.65	5.90	3.94	2.38	1.15	1.03	2.08	1.40	2.25	1.52	4.49	29.66
1887...........	72.8	79.1	74.1	65.9	50.0	40.5	27.3	19.1	29.5	38.4	53.6	66.5	51.40	1.14	1.57	2.38	3.13	1.98	1.18	2,73	1.48	5.19	0.76	1.84	2.54	26.93
1888...........	70.8	75.7	70.8	60.0	48.6	39.2	32.2	13.6	25.7	34.2	53.2	58.0	48.29	5.42	6.00	2.07	2.13	1.62	2.83	1.61	1.57	2.17	2.43	1.85	5.06	34.80
1889...........	70.3	71.4	73.2	64.0	50.3	37.6	42.6	27.0	23.5	41.2	53.1	60.7	51.32	2.97	6.78	0.95	5.14	[illegible]	1.80	1.08	1.89	0.90	1.04	3.60	5.72	34.75
1890...........	76.4	78.0	71.2	63.7	54.0	44.0	38.8	28.9	33.8	32.6	54.9	60.1	52.45	3.41	2.49	1.77	4.46	2.44	1.87	0.03	1.81	1.09	2.43	1.79	3.34	26.97
1891...........	71.5	70.6	71.1	70.9	54.5	35.5	37.9	31.6	29.7	31.1	54.0	60.5	51.74	3.66	2.77	6.10	0.49	1.49	3.69	1.33	2.59	1.32	2.27	5.06	2.56	33.15
1892...........	73.0	74.6	74.8	67.2	57.2	36.4	25.9	19.6	33.6	36.2	49.2	58.1	50.48	2.65	6.18	1.07	3.21	0.71	3.16	1.50	1.96	1.61	2.91	6.15	6.84	37.45
1893...........	73.0	78.0	72.0	69.0	57.0	39.0	29.0	14.2	21.3	36.6	49.9	59.8	49.90	2.37	2.60	1.16	3.18	0.33	2.29	0.90	0.92	1.76	2.66	5.41	4.36	24.94
1894...........	76.0	78.0	77.0	68.0	56.0	37.0	35.0	28.0	26.0	46.0	54.0	63.0	53.80	2.85	0.37	0.51	4.86	1.28	2.24	1.06	2.24	1.46	2.52	2.75	3.00	25.20
1895...........	73.0	74.0	76.0	71.0	50.0	39.0	31.0	20.0	19.0	38.0	55.0	64.0	50.08	2.61	5.46	2.28	2.67	0.37	2.58	4.24	1.44	0.19	1.05	3.38	3.05	29.42
1896...........	72.0	76.0	75.0	62.0	52.0	38.0	36.0	29.0	30.0	36.0	60.0	70.0	53.00	2.18	8.01	3.90	9.44	1.71	1.01	0.81	0.85	1.23	0.88	2.35	4.40	36.77
1897...........	73.0	78.3	.....	.....	.....	.....	.....	23.0	31.0	39.0	51.0	61.0	......	5.48	6.75	.....	......	.....	.....	. .	4.90	0.96	4.16	3.54	1.86	......

TABLE VIII. METEOROLOGICAL TABLES—CONTINUED.

1874—OMAHA—1897.

Lat., 61° 0′ N.; Long., 96° 0′ W. Elevation above sea level, 1,113 feet. Observations represent Western Iowa.

YEARS.	COMPARATIVE MEAN TEMPERATURE (DEGREES).													COMPARATIVE PRECIPITATION (INCHES).												
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean for year.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for year.
1874	73.1	79.6	77.2	63.7	53.6	36.0	28.2	22.2	23.0	33.1	44.7	66.1	49.12	6.93	0.54	2.08	7.18	1.45	1.05	0.54	0.39	0.92	1.49	2.01	1.24	25.75
1875	70.9	74.2	70.0	63.5	47.6	32.6	33.9	10.8	25.7	30.2	44.9	62.9	47.18	10.95	10.01	7.77	2.55	1.16	0.13	1.00	0.26	0.51	1.24	3.06	4.25	39.89
1876	68.2	75.2	74.9	63.2	49.9	33.1	19.0	26.7	30.4	29.2	51.1	63.0	48.51	3.47	7.30	6.27	4.93	0.69	1.17	0.16	0.23	0.40	3.18	2.65	2.07	32.51
1877	69.1	75.6	72.6	66.4	51.2	36.0	38.9	20.2	37.3	33.9	50.1	60.3	50.96	8.30	0.96	3.18	2.05	5.86	1.39	2.14	0.53	0.44	1.26	6.24	8.62	40.93
1878	60.7	79.0	76.8	64.1	53.0	43.8	21.5	28.8	36.7	47.9	54.6	58.1	52.00	8.48	7.66	2.48	3.22	0.55	0.29	0.27	1.23	0.14	3.09	3.97	5.77	37.05
1879	72.7	78.5	75.0	62.5	61.5	40.3	17.3	21.7	26.8	41.0	53.6	60.8	50.96	4.09	3.17	1.51	1.43	3.64	4.25	1.75	0.07	0.93	2.17	1.77	5.53	30.41
1880	73.0	76.7	74.2	62.9	40.2	26.4	18.4	34.5	30.9	35.9	51.2	69.4	50.22	3.14	5.36	7.10	2.91	3.54	1.70	0.28	0.90	0.14	0.50	0.55	3.40	29.52
1881	74.9	78.9	80.2	66.0	54.4	36.9	36.0	11.8	17.0	37.6	44.4	67.8	50.56	5.56	5.89	1.65	8.36	4.84	1.29	1.56	0.61	3.09	0.82	4.23	7.94	45.75
1882	71.0	71.7	73.1	67.5	57.2	39.7	24.6	27.5	36.3	40.2	52.0	56.6	51.11	12.05	6.78	0.95	0.51	5.09	1.42	0.92	0.74	6.60	0.79	5.91	4.91	45.59
1883	69.1	75.7	71.3	0.8	49.4	39.2	28.1	11.9	21.7	34.6	53.6	57.3	47.76	12.70	4.79	3.39	4.53	5.03	0.64	0.73	1.01	1.00	0.52	3.20	11.29	48.83
1884	72.3	74.5	70.3	68.6	57.3	39.3	17.3	17.0	19.4	35.3	47.5	61.6	48.36	6.11	10.35	7.07	4.91	5.81	0.82	0.72	0.73	1.42	4.91	3.88	1.45	47.68
1885	71.2	77.0	69.9	64.5	49.8	39.9	28.6	12.2	16.6	36.1	50.1	59.8	47.47	2.67	9.24	6.99	2.50	3.86	0.73	1.17	0.41	0.47	0.33	0.34	4.43	33.14
1886	70.2	77.8	75.6	65.1	58.3	34.3	17.9	11.9	24.4	31.9	60.9	65.1	48.52	1.50	0.69	4.53	4.45	1.38	1.54	1.46	1.15	0.86	1.81	7.77	4.58	24.67
1887	72.4	76.3	72.0	65.3	50.7	39.6	23.6	11.8	16.2	38.0	54.5	66.1	48.95	4.56	2.02	3.94	2.44	0.72	0.89	1.11	0.49	1.00	0.48	0.88	1.39	19.93
1888	70.0	77.6	70.3	61.3	48.4	36.7	30.4	8.0	25.9	28.8	52.5	55.9	47.15	3.86	2.56	3.44	0.24	1.19	0.12	0.96	0.58	0.74	4.25	2.95	4.86	20.88
1889	68.7	74.8	74.0	63.6	52.2	35.3	39.4	22.8	21.1	40.2	52.4	61.6	50.50	5.44	4.94	2.90	1.74	0.34	0.87	0.58	1.62	0.23	0.53	1.19	2.67	22.57
1890	74.0	78.8	70.5	63.7	52.0	42.0	35.0	18.0	25.0	33.0	55.0	60.0	50.58	5.04	3.74	1.08	2.50	1.09	1.01	0.08	1.44	0.54	1.35	1.55	2.72	22.08
1891	69.0	71.0	72.0	70.0	53.0	34.0	35.0	30.0	20.0	29.0	54.0	59.0	48.16	6.66	8.54	2.02	1.76	5.87	0.37	2.07	2.11	1.02	2.26	2.80	4.94	39.92
1892	71.0	76.0	78.9	68.0	57.0	38.0	22.0	18.0	30.0	34.0	48.0	54.0	49.08	1.51	3.64	2.50	1.63	1.28	0.14	1.79	0.42	0.64	2.74	4.82	8.43	29.44
1893	73.0	77.0	76.0	68.0	55.0	27.0	37.0	16.0	20.0	34.0	48.0	59.0	47.01	7.11	3.03	3.62	1.72	0.12	0.43	1.13	0.28	0.97	1.29	3.12	3.84	26.66
1894	74.0	77.0	75.0	67.0	55.0	37.0	33.0	21.0	22.0	43.0	54.0	65.0	50.22	4.74	0.61	0.36	2.48	2.94	0.11	0.94	0.51	1.30	0.91	2.31	0.61	17.82
1895	70.0	74.0	74.0	71.0	50.0	37.0	29.0	19.0	21.8	37.4	58.0	64.0	50.44	4.31	1.39	7.18	0.90	0.07	1.06	0.16	0.35	0.62	0.99	3.56	1.11	21.69
1896	72.0	74.6	73.9	60.0	51.5	29.8	35.3	27.4	32.6	31.6	56.1	66.9	54.00	1.90	4.53	3.50	3.90	3.72	2.02	0.50	0.83	0.33	1.31	4.28	9.51	35.82
1897	72.0	78.8	.....	.....	.....	.	.....	20.9	27.2	34.6	50.5	61.8	......	1.43	3.51	....	.	....	....	....	0.87	0.63	1.47	5.67	2.16	

TABLE IX. METEOROLOGICAL TABLES—CONTINUED.

1889—SIOUX CITY—1897.

Elevation above sea level, 537 feet.

YEARS.	COMPARATIVE MEAN TEMPERATURE (DEGREES).													COMPARATIVE PRECIPITATION (INCHES).												
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean for year.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for year.
1889	.....	76.1	73.2	61.0	50.4	33.0	35.2	.....	.....	.....	.....	.....	.....	.....	3.31	1.19	1.71	0.21	1.99	1.14	.....	.....	.....	.....	.....	.....
1890	72.4	76.0	69.1	61.8	50.2	40.4	31.5	14.0	22.9	28.4	52.1	57.8	48.71	3.61	2.59	3.64	2.36	1.84	0.84	0.60	1.14	0.40	2.12	1.32	2.29	22.75
1891	67.8	69.2	70.2	68.1	50.5	30.2	30.0	27.5	13.4	24.7	52.6	50.9	46.25	7.62	5.77	3.54	0.91	3.04	0.87	2.48	1.66	1.26	2.01	2.22	2.41	33.29
1892	69.0	75.0	71.8	66.0	55.4	24.8	20.8	14.7	24.7	31.8	46.5	52.0	46.86	1.50	2.63	4.14	0.57	1.32	0.16	0.20	0.41	0.97	1.16	1.76	3.56	26.38
1893	72.0	75.0	70.0	66.0	51.0	34.0	20.0	12.6	15.2	23.1	44.6	57.0	47.79	1.63	2.29	5.85	1.11	0.58	0.75	1.57	0.34	0.77	1.43	3.56	3.17	23.45
1894	72.0	76.0	75.0	66.0	53.0	33.0	30.0	15.0	19.0	31.0	52.0	62.0	48.08	2.74	1.81	1.68	0.73	3.28	0.17	1.30	0.60	0.19	0.64	2.79	1.91	17.84
1895	68.0	73.0	73.0	68.0	47.0	33.0	26.0	14.0	19.0	34.0	57.0	62.0	47.08	4.95	2.63	1.54	3.91	0.10	0.00	0.02	0.16	0.33	0.50	3.20	2.15	20.29
1896	69.6	72.4	71.8	58.4	47.2	28.4	30.0	22.9	28.4	27.2	52.4	64.4	41.20	2.94	5.54	0.86	2.09	2.59	2.89	0.25	0.78	0.35	0.50	6.16	6.39	30.77
1897	68.0	74.2	.....	.....	.....	.....	.....	14.3	21.7	28.8	47.6	59.1		2.13	2.26		.....	.....	.....	.....	1.41	0.43	1.74	4.03	1.24	.....

TABLE X.

METEOROLOGICAL TABLES—CONTINUED.

1874—COMPARATIVE TEMPERATURE AND PRECIPITATION—1896.

Y'RS.	AVERAGE MEAN TEMPERATURE (DEGREES).							TOTAL PRECIPITATION (INCHES).						
	Davenport.	Des Moines.	Dubuque.	Keokuk.	Omaha.	Sioux City.	Cedar Rapids.	Davenport.	Des Moines.	Dubuque.	Keokuk.	Omaha.	Sioux City.	Cedar Rapids.
1874.	49	....	40	51	49	....	....	36.79	......	30.12	34.77	25.75	......	......
1875..	44	...	44	48	47	....	...	37.90	......	35.12	48.10	19.89	......	...
1876..	49	....	47	50	48	....	...	46.89	......	50.28	31.71	32.51	......	......
1877..	50	....	50	52	50	....	...	35.09	....	38.07	49.19	40.92	......	.....
1878..	53	..	50	55	52	....	...	31.12	......	38.26	31.78	37.05	.....	.....
1879..	50	51	48	52	50	....	....	33.80	32.60	23.51	23.51	30.41	......	.....
1880..	51	51	49	53	50	....	....	42.73	37.23	31.54	34.84	29.52	......	......
1881..	50	49	48	51	50	....	....	37.68	55.91	42.40	42.40	45.75	......	......
1882..	51	52	40	52	51	....	...	38.50	48.67	41.13	41.53	45.59	.....	......
1883..	48	46	45	49	47	....	...	35.33	41.79	39.65	38.65	48.83	.....	......
1884.	48	46	46	50	48	....	..	38.11	34.28	31.98	31.98	47.68	....	......
1885..	45	46	46	48	47	....	49	34.35	35.02	34.41	34.11	33.14	....	42.28
	AVERAGE BY MONTHS FOR 24 YEARS.							AVERAGE BY MONTHS FOR 24 YEARS.						
Jan..	18	18	17	21	19	17	19	1.32	0.97	1.56	1.56	0.78	0.70	0.16
Feb.	25	23	23	28	25	20	22	1.38	0.91	1.37	1.74	0.96	0.60	1.67
Mar..	35	35	32	38	35	31	33	2.25	1.03	2.11	1.96	1.03	1.20	2.44
Apr..	50	51	48	52	51	51	51	2.72	2.28	2.83	3.87	3.04	3.01	2.98
May.	61	61	60	63	62	59	60	4.07	3.35	3.90	4.13	4.37	3.83	4.31
June	71	71	68	71	72	70	73	3.60	4.23	4.93	4.30	5.87	3.29	3.79

YR'S.	AVERAGE MEAN TEMPERATURE (DEGREES).							TOTAL PRECIPITATION (INCHES).						
	Davenport.	Des Moines.	Dubuque.	Keokuk.	Omaha.	Sioux City.	Cedar Rapids.	Davenport.	Des Moines.	Dubuque.	Keokuk.	Omaha.	Sioux City.	Cedar Rapids.
1886..	47	49	48	49	48	....	47	22.62	29.17	29.66	29.66	24.67	.....	26.39
1887..	48	48	49	51	48	....	45	32.78	24.63	33.50	26.92	19.92	....	31.41
1888..	46	45	44	48	47	...	45	40.46	31.15	32.91	34.80	20.88	....	36.56
1889..	48	49	49	54	50	....	48	37.61	24.13	24.18	34.75	22.57	....	31.18
1890..	49	49	48	52	50	48	48	24.50	25.12	40.28	26.97	22.08	22.75	35.98
1891..	49	48	48	51	48	46	48	30.05	30.14	26.55	33.15	39.92	33.39	33.25
1892..	48	47	46	50	49	46	48	44.15	39.24	40.60	37.45	29.44	26.38	42.63
1893..	47	47	45	49	47	47	45	27.33	25.36	32.77	24.94	26.66	23.45	30.67
1894.	41	51	50	53	50	48	50	18.52	20.56	19.28	25.20	17.82	17.84	23.69
1895..	48	48	48	50	50	47	48	27.14	26.80	19.74	26.42	21.09	20.29	23.39
1896..	50	50	49	53	54	41	41	28.48	30.90	42.28	36.77	35.82	30.77	29.77
	AVERAGE BY MONTHS FOR 24 YEARS.							AVERAGE BY MONTHS FOR 24 YEARS.						
July.	75	73	74	77	76	74	73	3.80	2.54	4.43	3.57	4.27	3.79	3.74
Aug.	73	72	71	73	74	72	71	3.27	2.66	2.86	4.12	3.55	3.27	2.85
Sept.	65	64	62	65	65	64	63	3.27	2.45	4.41	3.61	2.70	1.09	1.79
Oct..	52	54	50	54	53	50	49	3.05	2.39	2.56	2.66	2.71	1.85	2.41
Nov..	37	37	35	41	37	32	32	2.68	1.84	2.01	2.03	0.91	1.18	1.73
Dec..	23	27	25	31	27	28	27	1.40	1.18	1.69	1.71	0.91	0.72	1.75

TABLE XI. METEOROLOGICAL TABLES--CONTINUED.

1880—DES MOINES—1897.

Maximum and Minimum Temperature for the Years Named.*

YEARS.	JAN.		FEB.		MARCH.		APRIL.		MAY.		JUNE.		JULY.		AUG.		SEPT.		OCT.		NOV.		DEC.		ANNUAL.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1880	63	10	68	1	80	- 3	84	26	98	44	93	48	94	53	96	51	87	41	77	26	62	0	49	17	98	- 3
1881..........	43	-19	45	- 8	52	6	81	11	88	40	96	54	98	56	103	57	93	40	88	32	60	6	56	10	103	-19
1882..........	51	- 1	65	1	74	10	83	31	83	33	92	44	92	52	91	51	92	37	80	33	71	15	50	17	92	- 1
1883..........	39	-26	50	-23	67	5	89	29	83	35	93	50	97	54	91	48	90	37	80	28	67	6	57	10	97	-26
1884..........	49	-30	54	- 8	70	- 6	74	26	80	35	95	47	95	55	91	49	92	43	86	28	64	2	50	18	95	-30
1885..........	47	-20	50	-20	63	7	76	26	98	28	96	44	100	54	90	16	87	45	77	29	66	21	55	- 3	100	-20
1886..........	36	-24	51	-20	69	8	88	20	98	37	101	44	104	56	101	46	98	38	84	27	68	9	54	-19	104	-24
1887..........	41	-24	58	-15	78	9	86	18	98	39	98	45	101	52	100	45	92	40	82	18	73	- 9	50	-12	101	-24
1888..........	43	-27	57	-20	72	- 4	79	21	81	34	88	43	99	56	96	46	90	33	79	27	75	19	60	11	99	-27
1889..........	50	- 1	52	-18	69	16	83	24	85	34	88	37	90	51	93	47	86	31	85	26	63	4	69	8	93	-18
1890..........	50	-18	59	- 5	66	- 8	83	25	89	32	96	49	101	55	97	48	89	33	79	22	67	19	66	8	101	-18
1891..........	47	6	55	-10	60	- 5	81	20	83	34	90	49	88	49	93	40	90	39	81	28	67	-10	60	0	93	-10
1892..........	50	-26	50	- 1	73	6	72	25	75	35	92	48	95	50	95	47	92	39	87	25	64	12	64	-16	95	-26
1893..........	42	-14	45	-16	74	1	80	23	83	33	90	47	95	56	94	42	93	30	83	19	65	- 8	52	-10	95	-16
1894..........	55	-27	54	- 8	74	4	87	28	90	36	99	43	104	52	100	47	93	37	83	30	66	4	65	- 8	104	- 8
1895..........	64	-14	64	-18	88	3	85	28	94	35	89	50	98	40	95	51	94	32	75	15	74	2	57	0	98	-18
1896	49	- 8	70	- 2	71	3	86	20	87	46	91	49	95	54	94	47	88	33	75	26	74	- 2	59	12	95	- 2
1897..........	61	-17	48	-14	60	- 2	79	29	88	39	....	.....	......	.....	......	......	......	.....	.....	......	......	......	.....	......	.....	.....

* Figures preceded by a dash (-) indicates below zero.

TABLE XII.

METEOROLOGICAL TABLES—CONTINUED.

1839—MUSCATINE AND IOWA CITY—1870.

Maximum and Minimum Temperature for the Years Named.*

YEARS.	JAN.		FEB.		MARCH.		APRIL.		MAY.		JUNE.		JULY.		AUG.		SEPT.		OCT.		NOV.		DEC.		ANNUAL.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1839.........	60	0	63	- 4	80	4	86	38	84	38	89	48	95	58	92	49	84	38	80	31	60	- 2	48	- 5	95	- 5
1840.........	39	-17	71	-25	63	12	86	27	85	37	88	57	87	58	86	54	76	44	77	25	66	19	55	- 2	88	-25
1841.........	52	-23	62	-14	68	18	77	27	90	33	96	49	96	56	96	48	96	35	72	18	66	- 4	47	- 8	96	-23
1842.........	52	-10	56	-13	84	13	84	28	86	33	92	43	94	50	96	42	92	35	80	23	69	-11	48	-21	96	-21
1843.........	50	-15	45	-19	38	10	78	5	88	27	90	40	95	55	94	46	92	45	84	12	56	10	44	8	95	-15
1844.........	41	- 6	56	0	66	6	72	30	85	36	90	48	94	56	92	46	93	33	74	16	68	7	58	- 6	94	- 6
1845.........	58	6	66	6	77	8	86	16	82	34	88	54	98	50	93	48	92	30	72	16	60	-17	42	12	98	-17
1846.........	56	12	50	- 8	72	20	82	28	86	38	82	54	94	44	94	54	92	42	80	16	62	2	54	6	94	- 8
1847.........	40	-23	56	-10	66	0	86	13	87	30	86	40	93	42	86	42	84	36	86	8	74	7	63	-10	92	-23
1848.........	50	- 8	50	4	70	8	80	22	84	35	88	33	85	48	86	48	84	33	72	27	50	5	44	- 6	88	- 8
1849.........	46	-24	48	-22	68	10	74	28	80	30	86	44	89	42	86	36	84	37	70	28	72	20	44	-12	89	-24
1850.........	46	-10	55	-14	64	10	78	18	86	24	83	40	94	50	94	50	84	30	80	22	66	16	44	- 6	94	-10
1851.........	46	-16	53	0	78	12	70	24	82	22	85	44	97	44	85	52	91	30	79	18	51	14	56	-18	97	-16
1852.........	53	-23	58	0	80	8	64	20	82	29	90	40	94	45	92	44	84	35	76	30	50	7	52	0	94	-23
1853.........	54	- 9	55	-11	66	5	71	27	81	34	91	49	87	46	92	41	89	37	75	10	60	15	48	- 1	92	- 9
1854.........	55	-14	60	-13	70	4	88	12	76	35	92	49	98	46	99	46	96	37	82	27	69	7	50	- 4	99	-14
1855.........	64	-23	40	11	68	- 2	87	24	86	27	91	35	95	55	96	58	92	35	84	15	67	10	60	-19	96	-23
1856.........	32	-26	42	-29	56	-17	77	27	90	40	97	50	93	55	91	40	91	28	82	25	64	4	42	-13	97	-26
1857.........	41	-30	57	-12	68	- 5	65	13	83	29	89	38	97	45	92	47	88	36	74	22	60	0	51	-13	97	-30
1858.........	52	8	46	-17	70	1	78	24	81	30	96	52	89	52	93	46	87	42	85	30	52	4	48	15	96	8
1859.........	50	-13	51	-13	67	23	72	22	82	45	85	40	97	46	92	42	87	34	82	15	75	12	46	-22	97	-22
1860.........	48	-26	58	-20	72	16	84	18	89	28	92	48	94	50	95	45	89	40	87	24	69	- 4	43	-22	95	-26
1861.........	39	-18	56	-15	64	8	73	28	78	35	89	51	97	47	99	47	88	40	74	28	65	5	62	- 5	99	-18
1862.........	38	-23	42	-25	64	5	67	25	84	39	89	42	95	56	99	55	88	41	86	17	6[illegible]	-15	52	- 3	99	-23
1863.........	59	0	44	-17	57	12	82	38	80	36	93	42	94	49	94	36	90	38	66	18	61	- 8	53	-23	91	- 8
1864.........	55	-26	56	-15	60	0	74	32	90	32	92	47	94	55	91	50	92	36	68	26	59	0	54	-14	94	-26
1865.........	46	-10	48	10	70	- 5	75	20	86	37	88	54	91	55	90	55	90	44	82	30	66	20	50	-17	91	-17
1866.........	47	-14	55	-20	60	4	86	22	84	35	90	48	94	60	85	43	85	33	82	20	72	-16	53	- 2	94	-14
1867.........	45	-18	53	-18	47	-13	70	27	79	31	90	52	92	55	85	50	87	43	80	32	72	0	42	- 2	92	-18
1868.........	50	-16	55	-26	75	3	78	18	84	46	92	47	96	53	92	48	81	32	73	30	63	18	50	-18	96	-18
1869.........	48	-14	63	- 8	72	12	80	20	92	40	85	44	86	52	96	57	80	38	78	16	70	5	.....	- 2	93	-14
1870.........	45	- 5	57	-10	56	4	90	24	89	44	99	50	100	55	96	50	90	36	75	25	66	20	54	-11	100	-11

* Observations made by T. S. Parvin, at Muscatine, 1839 to 1860, and at Iowa City, 1860 to 1870.

NORMALS OF TEMPERATURE FOR TWENTY YEARS.

The following table is compiled from observations of Prof. T. S. Parvin, from 1861 to 1871, and from those of Prof. G. Hinrichs, of the Iowa Weather Service, from 1871 to 1880, and are the result of nearly thirty thousand observations, which were made at Iowa City. The values given are for each decade of each month:

MONTHS.	MEAN TEMPERATURE, DEGREES F.				RAINFALL IN INCHES.			
	I.	II.	III.	Month.	I.	II.	III.	Month.
January	.52	.60	.60	1.72	18 7	19.1	20.8	19.4
February	55	.55	.70	1.80	22.0	24 4	27.1	24.4
March	.80	.95	1.10	2.85	29.6	32 2	37.3	33.1
April	1 20	1.20	1.10	3 50	43.3	47.9	51.6	47.6
May	1.20	1 20	1 35	3 75	55.5	60.0	63.8	59.9
June	1.65	1.65	1.55	4 85	66.3	69.8	71.8	69.0
July	1 65	1 27	1.20	4 12	73.7	74.1	73.8	73.9
August	1.42	1.65	1.85	4.92	73.1	71 8	69.6	71.2
September	1.80	1.55	1 25	4.60	66.4	62.9	59.4	62.9
October	1.10	.95	.90	2.95	55.0	50.3	45.1	49.9
November	.95	.82	.70	2.47	40.7	35.8	29.2	35.3
December	.60	.50	.50	1.60	26 3	23.2	20.2	23.1
Total for the year (mean)	.....	.....	.....	39.14	..	.....	....	47.47

RAINFALL FOR FORTY-FIVE YEARS.

The following is a record of the rainfall in Iowa for a period of forty-five years as observed at Muscatine, Iowa, by J. P. Walton, Rev .J. Ufford, S. Foster and Prof. T. S. Parvin, voluntary and Smithsonian observers:

Year.	Inches.	Year.	Inches.	Year.	Inches.	Year.	Inches.	Year.	Inches.	Year.	Inches.	Year.	Inches.	Year.	Inches.	Year.	Inches.
1846	34.55	1851	74.50	1856	41.94	1861	44 25	1866	32 86	1871	36.11	1876	53 57	1881	45.66	1886	31.82
1847	28.50	1852	59.38	1857	34.85	1862	55.16	1867	32.24	1872	35 44	1877	41.78	1882	46 67	1887	28.30
1848	39.62	1853	44 92	1858	58 45	1863	26.83	1868	40.91	1873	28.42	1878	39.30	1883	41 12	1888	38.89
1849	59 16	1854	23.66	1859	35 96	1864	33.77	1869	43 36	1874	34 78	1879	33.83	1884	45.49	1889	33.47
1850	49 08	1855	1.13	1860	25 10	1865	34 21	1870	24 61	1875	37.59	1880	35.78	1885	39 14	1890	31.87

MEAN FOR EACH MONTH DURING THE FORTY-EIVE YEARS.

January..1 92	March....2.71	May......4.40	July......3.95	Sept......3.80	Nov 2.54
February 2 08	April ... 3.37	June......4.78	August...4 40	October..3 04	Dec 2.35

FINANCIAL STATEMENT.

FOR THE BIENNIAL PERIOD ENDING JUNE 30, 1897.

RECEIPTS.

Warrants on State Treasurer June 30, 1895, to June 30, 1896		$ 4,995.73	
Warrants on State Treasurer June 30, 1896, to June 30, 1897		4,494.47	
			$ 9,490.20

EXPENDITURES.

June 30, 1895, to June 30, 1896—			
Secretary's salary	$ 1,200 00		
Expenses of board meetings	630.75		
Contingent expenses	3,164.98		
		$ 4,995.73	
June 30, 1896, to June 30, 1897—			
Secretary's salary	$ 1,200.00		
Expenses of board meetings	739.10		
Contingent expenses	2,555.37		
		$ 4,494.47	
			$ 9,490.20

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NINTH BIENNIAL REPORT

OF THE

Commissioners of Pharmacy

FOR THE

STATE OF IOWA.

1897.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

DES MOINES:
F. R. CONAWAY, STATE PRINTER.
1897.

REPORT OF COMMISSION.

COMMISSIONERS OF PHARMACY FOR STATE OF IOWA,
DES MOINES, IOWA, Nov. 1, 1897.

To His Excellency, Francis M. Drake, Governor:

We herewith submit to you the ninth biennial report of the Pharmacy Commission for the state of Iowa. The financial part of this report embraces the official biennial period from April 23, 1895, to April 23, 1897. Other information contained in this report is brought as nearly to date as possible.

During the biennial period above mentioned and the one preceding it, this department was unfortunate in the loss of a large amount of the state's money through the defalcation of the secretary and treasurer. The report of Suel J. Spaulding, secretary and treasurer, for the biennial period from April 23, 1893, to April 23, 1895, shows the amount collected for itinerant vendors' licenses, and paid to state treasurer, to be fourteen thousand five hundred and thirty-four dollars ($14,534). Sixty-nine hundred dollars ($6,900) of this amount was not paid said state treasurer as shown in said report. During the biennial period ending April 23, 1897, there was collected from itinerant vendors' licenses ten thousand one hundred and sixty-five dollars ($10,165). Of this amount six thousand four hundred and eighty-seven dollars ($6,487) was lost to the state in the same manner and by the same secretary and treasurer as above. Suit is now pending for the recovery of this money.

In the northern portion of the state there has been an increase in the number of drug stores due to the increased population, while in some parts of the state there has been no increase, but rather a decrease. This has been brought about largely by the changes in the laws which tended to lessen the revenues of pharmacists. There are at present nearly fifteen hundred drug stores in the state.

There has been a small increase in the number of per
force, as compared with the report of 1895. Notwithst
this fact, at no time since the passage of the law plac
sale of liquors in the hands of the pharmacists, has the
so little complaint of violations of the law by pharma
there is at the present time. This we believe to be on
of the passage of the law prohibiting the sale of malt
by pharmacists, and the establishment of saloons un
mulct law, together with a more rigid enforcement of t
The records of this office show that there has been asse
fines (costs not included) for violation of the pharmacy l
the law relating to the sale of intoxicating liquors by p
cists, since January 1, 1896, the sum of eight thousan
hundred and fifty dollars ($8,850). And there has been
the school fund in the different counties of the state—
fines—during the same period, six thousand and six
dollars ($6,069). The board has gradually raised the s
of the examinations yet the ratio of successful examin
not materially changed, showing that applicants are be
ting themselves than formerly.

Respectfully submitted,

JOHN. H. PICKETT,
FLETCHER HOWARD
W. L. LELAND,
Commissi

TREASURER'S REPORT.

pril 23, 1895, to April 24, 1896, of the Commissioners of Pharmacy for the State of Iowa, Fletcher Howard, treasurer.

RECEIPTS

From April 23, 1895, to April 24, 1896.

cations for examinations	$ 1,910	
cations for graduates	24	
cate certificates	6	
ges of locality	139	
quent renewals	60	
vals for 1896	2,567	
icates of percentage	4	
l receipts		$ 4,710
to Fletcher Howard	$ 1,570	
to J. H. Pickett	1,570	
to W. L. Leland	1,570	
l		$ 4.710

REPORT OF SECRETARY AND TREASURER

From April 23, 1896, to April 24, 1897.

cations for examination	$ 1,805.00	
cations for graduates	16.00	
cate certificates	19.00	
ges of location	157.00	
quent renewals	97.00	
vals for 1897	2,681.00	
icates of percentage	14.00	
l		$ 4,792.00
to Fletcher Howard	$ 1,597.34	
to J. H. Pickett	1,597.33	
to W. L. Leland	1,597.33	
l		$ 4,792.00

TREASURER'S REPORT

From April 23, 1895, to April 24, 1896, of the Commissioners of Ph
for the State of Iowa, Fletcher Howard, treasurer.

LICENSES ISSUED BY SUEL J. SPAULDING.

DATE.	NAME.
1895.	
April 24	J. C Roop
April 26	James Gardner
April 27	George W. Thompson
May 1	F. Pape
May 1	J. J. McNaul
May 13	B. C. Kay
May 10	Ida C. Hollister
May 6	H. R. Hansen
May 20	Frank McQueen
June 3	A. J. Kendig
June 4	John S. Barber
June 7	J. W. Graham
June 11	C. M. Conrad
June 12	F. A. Sabine.
June 17	Mrs. Mary Kinney
June 24	Otto Nelson
June 16	D. Gatten
June 17	S. C. Kirby
June 21	J. E. H. Long
June 22	W. H. Veno
June 28	J. B. Marshall
June 29	Benz. Rea
June 24	Dr. Lone Star
July 1	Thomas Morgan
July 10	J. W. Shaw
July 16	J. D. Staring
July 19	J. W. Boles
July 23	M. Hobson
July 20	L S. Derby
July 16	D. M. Jones
July 18	S. C. Deeter
July 27	F. M. Christy
July 31	Henry Ehrlich
Aug. 10	Jacob Golddertz
Aug. 14	P. D. Cunningham
Aug. 19	John Heinmiller
Aug. 15	B. H Westfall
Aug. 28	W. R. Alexander
Sept. 1	T. R. Sketchley
Sept. 9	Jacob Lutz
Sept. 9	J. M. Condon
Sept. 10	A. C. Fruth
Sept. 10	C. H. Starkey
Sept. 14	David Ewald
Oct. 12	B. E. Blunt
Oct. 12	C. L. Benshorf
Oct. 12	W. H. Clow
Oct. 12	F. T. Clow
Oct. 12	A. R. Crandall
Oct. 12	J. F. Darland
Oct. 12	S. E. Fritz
Oct. 12	Fred Fredericks
Oct. 12	W. S. Hall
Oct. 12	L. H Haynes
Oct. 12	C. D. Johnson
Oct. 12	J. N. Johnson
Oct. 12	A. Juhl
Oct. 12	M. McAnulty
Oct. 12	B. D. Paris
Oct. 12	P. C. Peterson
Oct. 12	H. A. Percival
Oct. 12	Guy Roush
Oct. 12	F. B. Tedro
Oct. 12	P. S. Thompkins
Oct. 12	L. P. Zolman
Oct. 12	H. C. Austin
Oct. 15	E. A. Eaton
Oct. 24	Mack Deal
Oct. 25	J. W. Arnott

LICENSES ISSUED BY SUEL J. SPAULDING—Continued.

DATE.	NAME.	AMOUNT.
1895.		
Oct. 29	G. S. Haynes	$ 100.00
Oct. 14	J. F. Duvall	100.00
Oct. 18	M. Sopp	100.00
Oct. 21	Mrs. M. E. Mosley	100.00
Oct. 22	E. L. Meyers	100.00
Oct. 26	A. G. Hopkins	100.00
Oct. 26	M. O. Roe	100.00
Oct. 30	N. J. Smith	100.00
Nov. 6	B. H. Cabbage	100.00
Nov. 9	J. W. Hillhouse	100 00
Nov. 1	J. M. Usry	100.00
Nov. 5	Harry Galleth	100.00
Nov. 12	Thomas L. Brennan	100.00
Dec. 2	William Hall	100.00
Dec. 12	Frank Dean	100.00
1896.		
Jan. 20	Charles L. Lewis	100.00
Jan. 20	A. S. Perryman	100 00
Jan. 21	E. G. Jones	100.00
Jan. 24	Mrs. M. O. Lewis	100.00
Nov. 27	Thomas E. Skoe	100.00
Feb. 4	J. E. Anderson	100.00
Mar. 10	J. L. Reed	100.00
Mar. 5	H. L. Knauss	100.00
	Total	$ 9,300.00
	Due and unpaid on license	135.00
	Total amount received by Spaulding	$ 9,165.00

LICENSES ISSUED BY FLETCHER HOWARD.

DATE.	NAME.	AMOUNT.
1895.		
Mar. 16	John Peters	$ 100.00
Mar. 28	O. D. Shepard	100.00
Mar. 25	H. A. Percival	100.00
Mar. 27	J. E. Crandall	100.00
Mar. 30	Bernard Boon	100.00
Mar. 24	H. E. Goodrich	100.00
April 1	Fred Watkins	100.00
April 15	W. S. Hall	100.00
April 10	M. M. Ullom	100.00
April 15	E. J. Goddfrey	100.00
	Total	$ 1,000.00
	Total money received	10,365.00

Paid to Fletcher Howard by Suel J. Spaulding and by Fletcher Howard to state treasurer	$ 677.90
Paid state treasurer by Fletcher Howard	1,000.00
Secretary Spaulding's shortage	6,487.10
J. H. Pickett, expense account	253.75
W. L. Leland, expense account	123.34
Fletcher Howard, expense account	97.78
Salary and office expenses of Secretary Spaulding	1,535.13
Fletcher Howard's salary as secretary and treasurer	200.00
Total	$10,365.00
Balance due Secretary Howard	200.00

ITINERANT LICENSES ISSUED BY CHAS. W. PHILLIPS, FROM APRIL 23, TO APRIL 23, 1897.

DATE.	NAME.	AMO
1896.		
June 8	C. D. Lawrence	$
June 8	G. Williams	
June 15	Adolph Lippman	
June 15	A. J. Kendig	
June 1	F. Pape	
July 13	Chas. E Skoe	
July 18	Craig Medical Co	
Aug. 1	E E. Raymond	
Aug. 9	Louis Turner	
Aug. 20	W. H. Bonwell	
Aug. 25	J. W. Graham	
July 31	Milburn Hobson	
Sept. 21	Will S. Genaro	
Oct. 3	Aart Haze	
Oct. 17	John S. Barber	
Oct. 17	E. B. Phoenix	
Oct. 17	M. McAnulty	
Oct. 18	F. T. Clow	
Oct. 17	A. R. Crandall	
Oct. 17	T. B. Tedro	
Oct. 17	E. L. Myers	
Oct. 26	C. D. Johnson	
Oct. 15	E A. Eaton	
Oct. 12	L. P. Zolman	
Sept. 11	E. E. Mull	
Nov. 15	E. E. Ashbaugh	
Nov. 19	Louis Turner	
May. 1	J. J. McNaul	
Nov. 20	J. N. Johnson	
Nov. 23	Dr. Tom	
Dec. 9	L. H. Haynes	
Sept. 5	B. A. Belcher	
Dec. 28	James H. Foster	
Dec. 30	C. R. Smith	
1897.		
Jan. 1	C. E. Creamer	
Jan. 5	W. J. Sutcliffe	
Jan. 6	John A. Swanson	
Jan. 13	David Jones	
Jan. 16	J. E. Johnson	
Jan. 28	H. C. Austin	
Jan. 28	U. E. Dawson	
Jan. 28	E C. Peterson	
Jan. 28	W. H. Clow	
Jan. 28	E. H. Barth	
Jan. 28	S E. Fritz	
Jan. 30	Mack Deal	
Jan. 30	Frank Dean	
Jan. 30	A. S. Perryman	
Feb. 4	J. L. Johnson	
Feb. 4	D. B. Harris	
Feb. 4	C. A. Wilson	
Feb. 9	H. E. Towns	
Feb. 9	W. L. Milleson	
Feb. 18	C. L. Benshoff	
Feb. 18	B. H. Cubbage	
Feb. 24	F. L. DeGraff	
Feb. 26	C. G. Dykes	
Mar. 5	H. L. Knauss	
Mar. 5	J. P. Hill	
Mar. 8	C. W. Colburn	
Mar. 11	W. J. Mason	
Mar. 12	Ernest Baum	
Mar. 12	J. L. Reed	
Mar. 17	August Reinke	
Mar. 16	G. Raymond	
Jan. 18	C. L. Loffler	
Mar. 23	Jos. Eveland	
Mar. 17	C. D. Shepard	
Mar. 26	R. Elijah	
Mar. 29	E. G. Johnson	
April 7	Warren LeBarron	
April 10	C. S. Logan	
April 16	W. S. Hall	
April 21	E. H. Sargent, Jr.	
	Total	$ 7,

Paid state treasurer	$ 5,000.00
Paid Chas. W. Phillips, salary and expenses	1,617.40
Paid Fletcher Howard, expense account	142.51
Paid J. H. Pickett, expense account	165.52
Paid W. L. Leland, expense account	74.57
Cash on hand	400.00
Total	$ 7,400.00

PERMITS IN FORCE NOVEMBER 1, 1897.

All the counties have reported except Des Moines, Wapello and Wright. The number of permits in force in the above counties are given as they appear in the last biennial report.

COUNTY.	No. permits repored.	COUNTY.	No. permits reported.	COUNTY.	No. permits reported.
Adair	5	Floyd	9	Monona	12
Adams	..	Franklin	11	Monroe	4
Allamakee	5	Fremont	5	Montgomery	4
Appanoose	5	Greene	12	Muscatine	6
Audubon	6	Grundy	8	O'Brien	7
Benton	8	Guthrie	6	Osecola	6
Black Hawk	17	Hamilton	14	Page	6
Boone	13	Hancock	10	Palo Alto	7
Bremer	5	Hardin	19	Plymouth	7
Buchanan	12	Harrison	8	Pocahontas	10
Buena Vista	11	Henry	11	Polk	54
Butler	10	Howard	11	Pottawattamie	7
Calhoun	14	Humboldt	15	Poweshiek	2
Carroll	8	Ida	......	Ringgold	8
Cass	9	Iowa	12	Sac	18
Cedar	6	Jackson	10	Scott	1
Cerro Gordo	8	Jasper	13	Shelby	3
Cherokee	4	Jefferson	8	Sioux	11
Chickasaw	5	Johnson	8	Story	14
Clarke	5	Jones	13	Tama	14
Clay	8	Keokuk	14	Taylor	9
Clayton	11	Kossuth	13	Union	6
Clinton	9	Lee	12	Van Buren	9
Crawford	5	Linn	16	Wapello	16
Dallas	11	Louisa	5	Warren	.....
Davis	1	Lucas	7	Washington	2
Decatur	5	Lyon	6	Wayne	3
Delaware	11	Madison	2	Webster	18
Des Moines	9	Mahaska	10	Winnebago	8
Dickinson	8	Marion	8	Winneshiek	8
Dubuque	8	Marshall	15	Woodbury	21
Emmet	6	Mills	6	Worth	5
Fayette	15	Mitchell	3	Wright	12
Total number granted in state					882

ABSTRACT OF STATE PHARMACY REGISTER.

Showing certificates now in force.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
121	Arts, David	June 14, 1880	As owner	Donnelson	Red Oak	Sept. 10, 1889	
232	Anderson, A. A	June 22, 1880	As assistant	Boone.			
328	Atkins, J. B	June 8, 1880	As owner	Council Bluffs.			
333	Arnold, C. V	June 4, 1880	As owner	Mt. Pleasant.			
391	Atwater, F. J	June 14, 1880	As owner	Manchester.			
1134	Allen, William P	July 7, 1880	As owner	Dubuque.			
1208	Ayers, W. L	June 15, 1880	As owner	Sheldon.			
1294	Agnew, David G	June 18, 1880	As owner	Wilton Junction.			
1638	Archer, William H	Aug. 12, 1880	As owner	Bear Grove	Adair	April 5, 1889	Out of business.
1667	Axt, Julius H	July 28, 1880	By examination	Fort Madison	Fort Madison	Nov. 5, 1888	
1709	Arnold, Charles	Aug. 4, 1880	By examination	Creston	Des Moines	April 4, 1895	
1786	Arnold, Charles F	Oct. 1, 1880	By examination	Sioux City.			
1981	Alexander, R. H	Oct. 5, 1880	By examination	Oskaloosa	Cameron, Mo	Mar. 19, 1892	
2061	Allen, B F	April 27, 1881	By examination	Wellman	Kalona	Oct. 1, 1885	
2200	Anderson, E	Oct. 12, 1881	By examination	Manson	Ruthven	Mar. 24, 1884	
2241	Alexander, W. A	Sept. 10, 1881	By examination	Leon.			
2479	Arthur, Charles H	May 8, 1882	By examination	Webster City	Webster City	Aug. 24, 1885	Out of business.
2506	Adams, Charles R	Aug. 1, 1882	By examination	Cedar Rapids.			
2544	Aplin, Arthur S	Oct. 23, 1882	By examination	Cambridge			Out of business.
2581	Alexander, T. R	Feb. 28, 1883	By examination	Marion.			
2605	Adair, Charles R	April 17, 1883	By examination	Logan	Yale	May 20, 1895	
2662	Adams, John R	July 17, 1883	By examination	De Soto	Lyons	April 10, 1888	
2726	Alexander, J. R	Mar. 6, 1884	By examination	Des Moines	Eureka Springs, Ark		Out of business.
2738	Arnold, R. R	April 15, 1884	By examination	Humeston			Out of business.
3036	Anders, F. W	June 15, 1886	By examination	Earlville.			
3129	Asbury, T. P	Feb. 28, 1887	By examination	Tingley.			
3146	Anderson, Aug	Mar. 1, 1887	By examination	Carroll	Coon Rapids	Oct. 19, 1887	
3148	Anderson, A. G	Mar. 11, 1887	By examination	Ogden.			
3211	Aborn, F. I	April 5, 1887	By examination	Sheffield.			
3250	Atkinson, J. H	May 17, 1887	By examination	Mason City.			
3317	Anderson, J. J	Sept. 20, 1887	By examination	Council Bluffs			Out of business.
3322	Adams, J. W	Oct. 8, 1887	As graduate	Mason City.			
3445	Andre, T. J	April 17, 1888	By examination	Schaller.			
3466	Allen, S. A	June 5, 1888	By examination	Sheldon	Sioux City.		
3504	Allison, S. M	Aug. 21, 1888	By examination	Nassau.			

3568	Adams, John Q	Dec. 20, 1888	By examination	Extra	Des Moines	July 2, 1894	
3645	Arthur, H. J.	April 19, 1889	By examination	Webster City.			
3666	Alt, George W	May 28, 1889	By examination	What Cheer	Williamsburg	July 16, 1894	
3794	Anderson, O. H	Jan. 7, 1890	By examination	Kingsley	Wesley	Dec. 1, 1893	
3902	Allen, E. D	June 27, 1890	As graduate	Mason City	Thornton	Feb. 17, 1892	
3951	Ackley, F. E.	Oct. 20, 1890	By examination	Foster	......	......	In Missouri.
3981	Anderson, E. K	Jan. 31, 1891	By examination	St. Charles.			
4025	Alderson, Miles	April 7, 1891	By examination	......	Strawberry Point.		
4099	Anderson, E. O	Aug. 15, 1891	By examination	Bancroft.			
4101	Andrews, W. E	Aug. 7, 1891	Graduate	Waterloo	Rock Rapids	May 28, 1893	
4131	Andy, C. H	Nov. 3, 1891	By examination	Humeston.			
4208	Adams, Harry B	April 5, 1892	By examination	Mason City.			
4220	Ady, Ross W	April 15, 1892	By examination	Osage	......	Aug. 15, 1895	
4231	Armstrong, E. L	May 19, 1892	By examination	Seymour	Grand River.		
4264	Ayersborg, G. S.	July 7, 1892	By examination	Vermillion	......	——, 1894	
4435	Allen, Charles E	April 4, 1893	By examination	New Sharon	Marcus	Sept. 18, 1895	
4474	Adams, H. D.	June 7, 1893	By examination	Winterset.			
4533	Armsden, William C	Dec. 8, 1893	Graduate	Aurora	Garner.		
4544	Algyer, Claud	Nov. 14, 1893	By examination	Sanborn.			
4569	Aldrich, Ed. A	Jan. 15, 1894	By examination	Creston.			
4587	Ahlers, Oswald U	Feb. 6, 1894	By examination	Bellevue.			
4594	Atzen, Charles B.	Mar. 6, 1894	By examination	Thor.			
4671	Atkinson, George H	June 5, 1894	By examination	Hartley	Creston.		
4700	Avery, A. M.	July 30, 1894	By examination	Maquoketa.			
4710	Anderson, C E	Aug. 14, 1894	By examination	Hull	Odebolt	Sept. 10, 1895	
4719	Abbott, Welcam A	Aug. 24, 1894	By examination	Manchester.			
4729	Amsberry, A L	Aug. 7, 1894	By examination	Lester.			
4843	Aldrich, Frank S	Mar. 12, 1895	By examination	Jefferson	Des Moines	Nov. 15, 1895	
4857	Ackert, Harry J	April 12, 1894	By examination	Marshalltown.			
4866	Armour, Frank C	April 2, 1894	By examination	Marshalltown.			
4884	Amundson, O. C.	May 7, 1895	By examination	Estherville.			
4788	Ayers, Charles Cyrus	Dec. 8, 1894	By examination	Decatur	......	......	Out of business.
4933	Armstrong, E. F	Sept. 1, 1895	Graduate	Cedar Rapids.			
4937	Albery, William F	Oct. 1, 1895	By examination	Hubbard	Polk City.		
4938	Arrasmith, P. A	Oct. 8, 1895	By examination	Griswold.			
4948	Armstrong, T. B	Nov. 6, 1895	By examination	Greeley.			
4958	Anderson, J. H	Dec. 4, 1895	By examination	Ruthven	Curlew	Dec. 17, 1896	
4975	Armitage, A. C	Jan. 7, 1896	By examination	Ellston.			
4978	Arnold, W. B	Jan. 7, 1896	By examination	Sloan	Whiting	Mar. 2, 1896	
4997	Andreen, Carl	Feb. 4, 1896	By examination	Sioux City.			
5039	Alexander, J. M	April 7, 1896	By examination	Rhodes	Marshalltown	June 3, 1896	
5112	Alley, C. E	July 7, 1896	By examination	Grinnell.			
5115	Albertson, O. C	Oct. 13, 1894	By examination	Hubbard.			
5121	Anderson, E. H	Aug. 4, 1896	By examination	Fonda.			
5137	Anderson, Wm. H	Sept. 1, 1896	By examination	Council Bluffs.			
5148	Adams, H. C	Sept. 4, 1894	By examination	Spencer	Algona	Oct. 1, 1895	
5209	Aborn, Fred. C	Mar. 2, 1897	By examination	Sheffield.			
5249	Allen, Will L	April 6, 1897	By examination	Pella.			
5256	Allen, R. E	Mar. 6, 1897	By examination	Ridgeway.			

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
2	Binford, E.	June 5, 1880	As owner	Dixon.			
8	Babson, J. E.	June 5, 1880	As owner	Mormontown	Blockton.		
72	Burnside, J. M.	June 7, 1880	As owner	Waucoma.			
85	Bills, E. B	June 5, 1880	As owner	Durant.			
125	Battles, James W	June 14, 1880	As assistant	Onslow	Menlo	Mar. 22, 1892	
215	Boerner, H. W	June 16, 1880	As owner	Iowa City.			
265	Brenton, A. G.	June 14, 1880	As owner	Adel	Plover	Feb. 12, 1894	
315	Beardsley, Wm	June 4, 1880	As owner	Beacon.			
323	Burrows, John P.	June 3, 1880	As owner	Clarinda			Out of business.
324	Bailey, A. S	June 7, 1880	As owner	Cromwell	Lorimer	Sept. 5, 1888	
326	Beberger, G. F.	June 21, 1880	As assistant	Carroll.			
331	Blair, W. H	June 10, 1880	As owner	Clarence.			
360	Bagnall, John I	June 7, 1880	As principal	College Springs.			
428	Blackinton, W. N	June 12, 1880	As owner	Denmark.			
449	Ballard, John W	June 9, 1880	As owner	Davenport.			
493	Booth, A. E	June 24, 1880	As owner	Prescott.			
547	Bayless, Frank D	June 17, 1880	As principal	Elkader.			
576	Bradshaw, A. C. D	June 2, 1880	As owner	Fairfield.			
629	Baldwin, E V	June 8, 1880	As owner	Hampton.			
713	Bush, John V	June 8, 1880	As owner	Colesburg.			
731	Busch, T. H.	June 30, 1880	As assistant	Davenport.			
759	Brownell, E. L.	July 30, 1880	As owner	Spirit Lake.			
776	Bissell, Charles E	June 2, 1880	As assistant	Lovilla.			
791	Beech, Thomas C	June 30, 1880	As assistant	Cedar Rapids.			
817	Blosser, George W	July 1, 1880	As owner	Moulton			
841	Backer, John H	June 14, 1880	As owner	Monticello.			
872	Belding, A. L	June 7, 1880	As assistant	Malcom	Knowlton	Sept. 1, 1895	
912	Bowman, J. K.	June 8, 1880	As owner	Beaman	Conrad Grove	Sept. 1, 1895	
952	Briggs, S. E	June 8, 1880	As owner	Nevada.			
955	Birney, C C.	June 26, 1880	As owner	Nora Springs	Estherville.		
1042	Beechler, George N	June 7, 1880	As owner	Oskaloosa.			
1142	Birney, Catharine	July 6, 1880	As owner	Floyd	Garner	Sept. 9, 1891	
1143	Birney, Lewis	July 6, 1880	As owner	Floyd	Nora Springs	Sept. 9, 1891	
1175	Brown, Wm. K	July 7, 1880	As owner	Dubuque.			
1181	Brimhall, S. M.	June 8, 1880	As owner	State Center	State Center	June 13, 1885	
1182	Brimhall, C. W	June 8, 1880	As owner	State Center.	Schaller	July 15, 1889	
1232	Bishop, Edward W	June 7, 1880	As owner	State Center.			

1254	Beach, Edward N.	June 8, 1880	As owner	Troy Mills.			
1285	Brubaker, Joseph S.	June 2, 1880	As owner	Vinton.			
1417	Brinkhoff, F. W.	June 4, 1880	As owner	Pella.			
1535	Bruce, O M.	July 24, 1880	As owner	Walnut.			
1557	Bixbey, R. J.	July 26, 1880	As owner	Edgewood.			
1558	Blanchard, Lewis	July 26, 1880	As owner	Edgewood.			
1602	Bridges, John	Aug. 14, 1880	As owner	Kossuth.			
1633	Brookings, D. J.	Aug. 18, 1880	As owner	Xenia	Woodward	Mar. 17, 1885	
1691	Broadie, A. A.	Aug. 2, 1880	By examination	Waverly.			
1729	Baker, Charles W.	Aug. 9, 1880	As assistant	Des Moines.			
1808	Beeman, O. D.	Oct. 20, 1880	As owner	Waukon.			
1824	Babcock, E. M.	Nov. 3, 1880	As owner	Wyoming.			
1830	Baughman, O. F.	Nov. 8, 1880	As assistant	Kinross	North English	Sept. 5, 1893	
1858	Bentley, N. J.	Aug. 3, 1880	By examination	Oskaloosa			In Salt Lake city
1870	Bice, D. Corwin	Oct. 19, 1880	By examination	De Soto			Out of business.
1882	Ballard, E. H.	Sept. 15, 1880	By examination	Estherville			Out of business.
1892	Burns, J. O.	Aug 13, 1880	By examination	Ottumwa	Emmetsburg	May 8, 1889	
1896	Bothwell, G. W.	Nov. 11, 1880	By examination	Fonda	Fairbank	Aug. 22, 1889	
1934	Burroughs, J. R.	Nov. 15, 1880	By examination	Washington.			
1951	Blackman, B. P.	Dec. 24, 1880	As owner	Bonaparte.			
1990	Brotherlin, H. L.	Dec. 21, 1880	By examination	Tipton.			
2081	Burroughs, S. W.	April 11, 1881	By examination	Holland	Allison	May 12, 1888	
2098	Battey, William E	Feb. 7, 1881	By examination	Muscatine			
2150	Berryhill, William	June 30, 1881	By examination	Clarinda	Clarinda	May 15, 1890	
2168	Burroughs, S. E.	July 25, 1881	By examination	Holland	Allison	Mar. 30. 1885	Out of business.
2187	Burns, E. M	Aug. 2, 1881	By examination	Council Bluffs	Mason City	Feb. 23, 1885	
2189	Beldon, M. J.	Aug. 8, 1881	By examination	Canton.			
2224	Butts, F. M.	Sept. 7, 1881	By examination	Wesley.			
2253	Brush, George W.	Oct. 19, 1881	By examination	Traer.	Sioux Center	Sept. 30, 1891	
2308	Bibbins, A. L	Jan. 9, 1882	By examination	Marshalltown	Bedford	June 9, 1885	
2330	Brown, Artemus	Jan. 24, 1881	By examination	Leroy.			
2359	Bruner, D. M.	Feb. 25, 1882	By examination	Olio.			
2405	Britten, S. P., Jr	April 25, 1882	By examination	Rockford	Mason City	April 16, 1884	Out of business.
2432	Burnett, Milo T.	May 24, 1882	By examination	Clyde	Luverne	Dec. 31, 1894	
2441	Bosley, James E	May 17, 1882	By examination	Marengo	Ladora	Dec. 17, 1886	
2481	Blythe, Calvin	June 20, 1882	By examination	Woodburn.			
2497	Bachman, E. W.	July 11, 1882	By examination	West Bend.			
2511	Bauer, William S	Aug. 8, 1882	By examination	Des Moines.			
2523	Brower, J. H.	Sept. 5, 1882	By examination	Calliope			Out of business.
2531	Bielenberg, J. R.	Sept. 14, 1882	By examination	Wheatland	Keystone	Jan. 3, 1887	
2553	Byrns, J. A.	Dec. 14, 1882	By examination	Marshalltown			Oakdale, Wash.
2567	Bilby, A. M.	Jan 16, 1883	By examination	Harvard	Galva	Feb. 10, 1896	
2580	Babcock. F. J.	Feb. 28, 1883	By examination	Belle Plaine		April 7, 1888	
2618	Boyd. John R.	April 30, 1883	By examination	Defiance.			
2654	Branson, W. S.	June 29, 1883	By examination	Irwin.			
2703	Beppler, J. F.	Nov. 23, 1883	By examination	Red Oak	Sioux City	Mar. 24, 1896	
2723	Bagley, James W.	Feb. 18, 1884	By examination	Afton	Creston	May 1, 1886	Out of business.
2805	Bullock, Frank H.	Sept. 16, 1884	By examination	Fayette.			
2811	Brown, Caleb	Oct. 7, 1884	By examination	Sac City.			
2824	Bennett, T. W.	Dec. 30, 1884	By examination	Lenox.			

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
2880	Beebe, J. T	Jan. 14, 1885	By examination	Afton.			
2881	Bosworth, L. M	May 26, 1885	By examination	Ames.			
2919	Benge, Alfred T	Sept. 7, 1885	By examination	Bloomfield			Chillicothe, Mo.
2947	Ballhelm, C. H	Nov. 3, 1885	By examination	Cedar Rapids			Out of business.
2954	Bleakmere, J. B	Jan. 4, 1886	By examination	Keosauqua			In Kansas.
2960	Bower, J. J. C	Jan. 12, 1886	By examination	Centerville.			
2975	Baker, W. S	Feb. 2, 1886	By examination	Pulaski	Farmington	Nov. 4, 1886	
2997	Burlingham, E. H	Mar. 16, 1886	By examination	West Union	Ft. Madison	Nov. 1, 1888	
3020	Burd, Edwin	May 18, 1886	By examination	Lisbon			Out of business.
3050	Bale, William G	July 20, 1886	By examination	Iowa City	Webster City	June 9, 1890	
3059	Baas, Leo F	July 27, 1886		Mapleton	Clear Lake.		
3074	Berringer, Will J	Sept. 13, 1886	By examination	Des Moines	Defiance	Nov. 19, 1889	
3080	Beck, Louis	Sept. 29, 1886	By examination	Des Moines			In Kansas City.
3104	Bertram, R. T	Dec. 7, 1886	By examination	Albia.			
3116	Busch, W. C. A	Mar. 25, 1887	Graduate	Muscatine.			
3118	Barrell, George M	Jan. 24, 1887	By examination	West Union			In Massachus'ts.
3126	Biddinger, J. W	Mar. 16, 1887	By examination	Quasqueton	Afton	April 21, 1897	
3128	Blanchaine, C. H	Mar. 21, 1887	By examination	Ossian.			
3132	Brown, Erasmus C	Feb. 14, 1887	By examination	Council Bluffs.			
3155	Burbank, George W	Feb. 25, 1887	By examination	Allison.			
3161	Brubaker, C. W	Feb. 25, 1887	By examination	Vinton.			
3162	Boener, Ed. A	Feb. 25, 1887	By examination	Iowa City.			
3163	Brown, Oscar H	Mar. 15, 1887	By examination	Council Bluffs.			
3177	Benedict, George	Mar. 15, 1887	By examination	Maxwell.			
3179	Bone, H. C	Mar. 15, 1887	By examination	Grand River.			
3214	Beldenkopf, G. M	April 5, 1887	By examination	Des Moines.			
3218	Bisom, Charles M	April 19, 1887	By examination	Audubon	Brayton	June 15, 1887	
3219	Brown, Charles J	April 19, 1887	By examination	Dubuque.			
3246	Berryman, A. J	May 17, 1887	By examination	Bancroft.			
3276	Boener, Emil L	July 7, 1887	Graduate	Iowa City.			
3281	Burke, James F	July 19, 1887	By examination	Denison.			
3302	Bechmann, O. C	Aug. 15, 1887	Graduate	Cherokee.			
3303	Bronson, E. C	Aug. 15, 1887	Graduate	Battle Creek.			
3306	Baker, Lincoln E	Sept. 9, 1887	By examination	Mason City	Greene	Mar. 26, 1891	
3312	Baxter, C. V	Sept. 6, 1887	By examination	De Witt			Out of business.
3346	Bacon, George	Nov. 15, 1887	By examination	Clinton			Out of business.
3385	Briles, W. R	Jan. 4, 1888	By examination	Chariton.			

3401	Begun, Charles A.	Feb. 22, 1888	By examination.	Cedar Falls	Des Moines	May 16, 1890	
3418	Bollard, J. B.	Mar. 20, 1888	By examination.	Fonda.			
3427	Barnard, C. G.	Mar. 27, 1888	By examination.	Des Moines.			
3428	Bayless, C. D	Mar. 28, 1888	By examination.	Postville	Waukon	April 26, 1889	
3430	Beltenman, C. A.	April 3, 1888	By examination.	Arcadia.			
3444	Blair, James E	April 17, 1888	By examination.	Sioux City.			
3457	Bosshard, William E.	May 15, 1888	By examination.	Sioux City			In Wisconsin.
3483	Bliss, N G.	July 3, 1888	By examination.	Colfax	Colfax	Sept. 9, 1888	
3491	Brink, Milber	July 17, 1888	By examination.	Boyden.			
3502	Brooks, W. R.	Aug. 10, 1888	By examination.	Oto	Schaller	Aug. 15, 1895	
3514	Barlow, A. W	Aug. 28, 1888	By examination.	Essex	Osceola	Sept. 24, 1895	
3519	Bare, O H.	Sept. 4, 1888	By examination.	Winterset	Pleasantville	Dec. 8, 1888	
3524	Bucholz, Emil A.	Sept. 4, 1888	By examination.	Sigourney	Gravity	Mar. 10, 1896	In Illinois.
3527	Brincken, Anton	Sept. 5, 1888	By examination.	Rockford.			
3546	Beck, W. R	Oct. 16, 1888	By examination.	Moulton	Eldon	Jan. 10, 1890	
3584	Bartholomew, H. H.	Jan. 25, 1889	By examination.	Marengo			In Quincy, Ill.
3587	Bergen, O. C.	Jan. 14, 1889	By examination	Shellsburg			Out of business.
3590	Bamford, William M.	Feb. 5, 1889	By examination.	Dunlap			In Nebraska.
3595	Birchard, Rufus	Feb. 11, 1889	By examination.	Kellogg.			
3597	Blair, C. A.	Feb. 12, 1889	By examination.	Creston	Cherokee	Sept. 23, 1896	
3624	Blinn, S. W	Mar. 19, 1889	By examination.	Nashua.			
3656	Blanchaine, H. J	May 15, 1889	By examination.	Elkader	La Porte City	Sept. 4, 1889	
3669	Burbank, William J	June 4, 1889	By examination.	Allison.			
3693	Bender, G B.	July 23, 1889	By examination.	Spencer.			
3702	Butterworth, H. O.	Aug. 10, 1889	Graduate	Maquoketa.			
3703	Boadle, H H	Aug. 11, 1889	Graduate	Waverly.			
3715	Burns, Warren A.	Aug. 23, 1889	By examination	Foster	Ottumwa	Mar. 5, 1890	
3741	Bain, John	Oct. 1, 1889	By examination	Brandon.			
3758	Beaman, James D	Oct. 23, 1889	By examination	Chariton.			
3773	Bollbaugh, W. R.	Nov. 26, 1889	By examination	Prairie Grove	Osceola	Nov. 4, 1892	
3781	Brown, L. E.	Dec. 14, 1889	By examination	Onslow	Parnell	April 15, 1895	
3782	Bond, L. L.	Dec. 16, 1889	By examination	West Side			Out of business.
3783	Boehmler, H E.	Dec. 16, 1889	By examination	Cedar Falls	Hampton	Jan 13, 1890	
3817	Beam, Charles H	Jan. 31, 1890	By examination	Mapleton	Rolfe	Feb. 10, 1894	
3818	Bales, D. D	Feb. 3, 1890	By examination	Maxwell	Ames	Jan. 18, 1894	
3830	Brimhall, W. F.	Feb. 18, 1890	By examination	State Center.			
3850	Brink, H. J	Mar. 18, 1890	By examination	Remsen	Doon	Sept. 18, 1893	
3859	Briggs, George H	Mar. 3, 1890	Graduate	Nevada.			
3860	Brinkoff, Carl W	Mar. 5, 1890	Graduate	Pella.			
3877	Branson, L. H.	April 15, 1890	Graduate	West Branch.			
3898	Berry, A. S	May 6, 1890	Graduate	Moulton	Walnut	Oct. 11, 1892	
3922	Blackman, R. E.	Aug. 29, 1890	By examination	Sioux City.			
3938	Brown, H. F.	Sept. 19, 1890	By examination	Fonda	Lake Park.		
3971	Bonney, A. F.	Jan. 2, 1891	By examination	Rodney	Buck Grove	Dec. 3, 1894	
3983	Barber, Harry A.	Jan. 31, 1891	By examination	Cedar Rapids	Iowa Falls	June 20, 1891	
4000	Baker, Charles D.	Mar. 3, 1891	By examination	Toledo.			
4004	Boschnagel, F.	Mar. 3, 1891	By examination	Riverside	Lone Tree.		
4015	Bourne, Frank	Mar. 7, 1891	By examination	Cedar Rapids	Alburnette	Nov. 5, 1895	
4024	Becker, William	Mar. 7, 1891	By examination	Elkader.			
4031	Blaise, Theo. T.	April 8, 1891	By examination	Sigourney	Mason City	July 23, 1896	

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
4052	Brooks, Harry A	May 8, 1891	By examination	Oto.			
4058	Barmore, Virge A	May 19, 1891	By examination	Spirit Lake	Sutherland	May 8, 1895	
4062	Bieser, J. H	June 1, 1891	By examination	Odebolt.			
4064	Benson, Nils J	June 2, 1891	By examination	Burlington	Prairieburg	Jan. 14, 1892	
4094	Bosworth, A. H	Aug. 4, 1891	By examination	Shellsburg	Center Point	Oct. 13, 1891	
4112	Butterworth, W. F	Sept. 1, 1891	By examination	Andrew	Maquoketa.		
4128	Berkley, Samuel L	Oct. 21, 1891	By examination	Woodbine.			
4139	Burgett, William Q	Nov. 10, 1891	By examination	Fort Dodge	Newell	June 7, 1892	
4148	Blakeslee, J. H	Nov. 30, 1891	By examination	Des Moines	Oskaloosa	June 6, 1892	
4149	Blair, Frank L	Dec. 1, 1891	By examination	Clarinda.			
4174	Barkalow, W. B	Feb. 2, 1892	By examination	Atalissa		Jan. 11, 1893	
4184	Barlow, O. J	Feb. 18, 1892	By examination	Des Moines.			
4187	Bear, Winfield S	Feb. 26, 1892	By examination	Decatur City		Jan. 2, 1895	
4188	Busby, John R	Feb. 26, 1892	By examination	Oskaloosa	Rose Hill	Dec. 20, 1893	
4205	Bolding, W. R	Mar. 30, 1892	By examination	Wayland	Wayland	——— —, 1895	Out of business.
4215	Bertsch, George P	April 5, 1892	By examination	Oskaloosa	Oskaloosa	Aug. 27, 1894	
4235	Boody, Frank D	May 17, 1892	By examination	Rolfe	West Bend	Mar. 30, 1893	Out of business.
4241	Brown, Harry L	June 7, 1892	By examination	Columbus Junction.			
4251	Bliss, George W	June 27, 1892	Graduate	McGregor.			
4252	Bille, John	June 7, 1892	By examination	Greenfield	Mount Auburn	April 2, 1893	
4256	Braunworth, A. L	July 1, 1892	Graduate	Muscatine.			
4260	Braunlich, Hugo	July 2, 1892	Graduate	Davenport.			
4280	Baker, George B	Aug. 2, 1892	By examination	Keota	Richland	Sept. 11, 1894	
4281	Beauchamp, C. E	Aug. 2, 1892	By examination	Bloomfield.			
4311	Bauer, Julius A	June 6, 1892	By examination	Des Moines.			
4319	Bowen, R. F	Oct. 4, 1892	By examination	Mason City.			
4368	Barrows, C. H	June 31, 1893	By examination	Lamoni.			
4369	Backer, W. G	June 31, 1893	By examination	Sloan	Hornick, W'dbury Co	Mar. 17, 1896	
4374	Borman, W. H	Feb. 7, 1893	By examination	Garner.			
4385	Becker, John G	Feb. 22, 1893	By examination	Dubuque.			
4392	Brooks, W. W	Mar. 7, 1883	By examination	Sibley	Clear Lake	Mar. 31, 1894	
4414	Bauman, Robert	Mar. 24, 1893	By examination	Little Rock	Meservey	Nov. 28, 1893	
4421	Bernhardt, J. M	Mar. 8, 1893	By examination	Le Mars	Le Mars	Jan. 14, 1895	
4444	Blair, Milton M	May 2, 1893	By examination	Creston	Des Moines	July 1, 1897	
4455	Bowman, I. L	May 2, 1893	By examination	Zearing	Martinsburg	Dec. 17, 1896	
4461	Blagburn, John F	May 3, 1893	By examination	Des Moines			Out of business.
4479	Burrett, Alva W	June 24, 1893	By examination	West Union	Armstrong	Oct. 10, 1896	

4510	Brunt, I. W	Sept. 5, 1893	By examination	Decorah.			
4534	Biddinger, L. H	Oct. 8, 1893	By examination	Creston	Randolph	April 18, 1897	
4535	Baird, T. J.	Oct. 31, 1893	By examination	Wyoming.			
4542	Burns, Charles E	Nov. 8, 1893	By examination	Ottumwa	Des Moines	June 11, 1897	
4546	Brown, Eugene F	Nov. 21, 1893	By examination	Maquoketa.			
4558	Barrett, W. H	Dec. 12, 1893	By examination	Dunlap	Mallard	Jan. 24, 1896	
4561	Bell, P H	Dec. 19, 1893	By examination	Van Horne	Coon Rapids	Sept. 27, 1894	
4575	Barnett, J. M	Feb. 6, 1894	By examination	Adel	Mitchellville	Mar. 12, 1897	
4589	Bigler, Louis E	Mar. 8, 1893	By examination	Clermont	West Union	Feb 27, 1895	
4605	Bunting, Mrs. F. M	Mar. 8, 1894	By examination	Rock Valley.			
4628	Buck, Charles W	April 8, 1894	By examination	Moulton	....	....	Winigan, Mo.
4631	Bigley, John P	April 10, 1894	By examination	Clarion	Emmetsburg.		
4647	Bleakley, E. L	June 6, 1893	By examination	Grand Junction	Glenwood	Jan 22, 1897	
4658	Bray, Frank B	June 5, 1894	By examination	Danbury	Ute	Jan. 9, 1895	
4659	Brown, L W	June 5, 1894	By examination	Missouri Valley.			
4696	Beam, Harry E	July 3, 1894	By examination	Anamosa	Ft. Dodge	April 15, 1897	
4699	Bohning, A E	Aug. 7, 1894	By examination	Kamrar	Ackley	July 20, 1897	
4763	Bracken, Z. E	May 2, 1893	By examination	Modale.			
4765	Bidlack, Joseph L	Oct. 12, 1894	By examination	Manilla.			
4786	Brown, J. W	Dec. 4, 1894	By examination	Morning Sun.			
4791	Bleich, Herman F	Dec. 18, 1894	By examination	Des Moines	Ledyard	Sept. 15, 1896	
4804	Bruckner, Edw	Jan. 2, 1894	By examination	Bellevue	Dyersville	Jan. 20, 1897	
4828	Briar, John	Mar. 5, 1895	By examination	Des Moines.			
4842	Broxam, A. L	Mar. 12, 1895	By examination	Maquoketa.			
4845	Burrichter, William C	Mar. 18, 1895	By examination	Panora.			
4847	Barkl, Charles E	Mar. 19, 1895	By examination	Des Moines	Sac City	Jan. 3, 1897	
4860	Bundy, Edgar A	April 2, 1894	By examination	Aurelia	Larrabee	Dec. 23, 1896	
4862	Boyer, W. M	April 2, 1894	By examination	Hamburg.			
4876	Birney, Emma H	May. 7, 1895	By examination	Nora Springs.			
4889	Barrager, Emory L	May 18, 1894	By examination	Ashton	Sheldon	Mar. 1, 1895	
4893	Bradshaw, S. M	June 4, 1895	By examination	George.			
4915	Banks, Edw. P	Oct. 3, 1893	By examination	Kingsley	Ute	June 26, 1895	
4940	Bundy, J. W	Oct. 29, 1895	By examination	Adel	Waukee	Dec. 31, 1895	
4967	Ballard, Harry W	Dec. 14, 1895	By examination	Davenport.			
4968	Bowman, Ralph H	Dec. 31, 1895	By examination	Delhi.			
4984	Bush, John A	Feb 4, 1896	By examination	Colesburg.			
49·5	Boyson, G. H	Feb. 4, 1896	By examination	Cedar Falls	Cedar Rapids	Aug. 20, 1896	
4992	Beerkle, John F	Feb. 4, 1896	By examination	Creston.			
5002	Bartlett, W. S	Feb. 4, 1896	By examination	Burlington.			
5008	Bull, A. S	Mar. 3, 1896	By examination	Lenox	Wellman	Feb. 17, 1897	
5019	Butcher, John	Mar. 3, 1896	By examination	Knoxville	Blakesburg	Nov. 24, 1896	
5045	Ballentine, W. A	April 7, 1896	By examination	Janesville	Mason City	May 1, 1897	
5057	Butts, Claude M	April 7, 1896	By examination	Northwood.			
5079	Barnes, L. M	May 5, 1896	By examination	Strawberry Point.			
5103	Burt, C. A	July 7, 1896	By examination	Colfax.			
5106	Benthall, Eugene	July 7, 1896	By examination	Marshalltown	Spencer	Mar. 18, 1897	
5109	Bogle, Grace A	July 7, 1896	By examination	Wayland	Pawnee City, Neb.		
5141	Beman, S. Alcinda	Sept. 1, 1896	By examination	Iowa City.			
5143	Beard, E. L	Sept. 1, 1896	By examination	Grinnell.			
5163	Brock, W. B	Nov. 10, 1896	By examination	Olin.			

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
5175	Beck, J Conrad	Dec. 1, 1896	By examination	Bellevue.			
5177	Bartz, Edward R	Dec. 1, 1896	By examination	Rockford.			
5188	Beard, Abner R.	Jan. 14, 1897	By examination	De Witt			
5210	Barrett, G. N	Mar. 2, 1897	By examination	Boone.			
5224	Brown, J. H	Mar. 9, 1897	By examination	Davenport.			
5246	Babcock, C. B.	April 6, 1897	By examination	Des Moines.			
5247	Blanchard, H. E	April 6, 1897	By examination	Wapello.			
5248	Breen, Joseph W	April 6, 1897	By examination	Iowa City.			
5255	Blanche, R. J	April 6, 1897	By examination	Conrad	Ft. Dodge	May 8, 1897	
5257	Biglow, Zella	April 6, 1897	By examination	Lost Nation.			
5266	Brown, Lewis O	May 4, 1897	By examination	Northwood.			
5280	Babcock, H. M.	June 1, 1897	By examination	Ruthven.			
5283	Brattain, James	June 1, 1897	By examination	Oskaloosa.			
10	Cain, John G.	June 7, 1880	As owner	Polo.			
13	Cross, John T.	June 2, 1880	As owner	Farmington.			
91	Clure, Joseph.	June 9, 1880	As owner	Elliott	Des Moines	Oct. 10, 1892	Out of business.
173	Cloughly, William	June 12, 1880	As owner	Audubon.			
184	Cousins, W. B	June 21, 1880	As owner	Albia.	Davenport.		
214	Carter, George	June 14, 1880	As owner	Le Mars.			
244	Cherry, J W	June 7, 1880	As owner	Afton	Creston	April 29, 1895	
492	Cole, T. R	June 23, 1880	As owner	Marysville.			
587	Clarke, George D	June 8, 1880	As owner	Fairfield.			
600	Cole, John L	June 15, 1880	As owner	Greene.			
616	Crow, William M	June 5, 1880	As owner	Grand Junction.			
707	Camp, Americus	June 4, 1880	As owner	Kellerton.			
708	Camp, Marshall	June 4, 1880	As owner	Kellerton.			
874	Canon, J. H	June 5, 1880	As owner	Muscatine.			
965	Carson, George	June 7, 1880	As owner	New Sharon.			
960	Churchill, Frank	July 5, 1880	As assistant	Burlington.			
1007	Castle, Charles A.	June 16, 1880	As assistant	Ottumwa.			
1151	Childs, H. A	July 6, 1880	As owner	Lenox.			
1268	Coffin, R. M	June 9, 1880	As owner	Tama City.			
1300	Chilcote, William E.	June 18, 1880	As owner	Washington.			
1301	Cook, William A.	June 18, 1880	As owner	Washington.			
1405	Cummins, M. L	July 14, 1880	As owner	La Porte City.			
1421	Clark, Eaton K.	June 26, 1880	As owner	Seymour.			

1450	Cooling, A. A.	July 17, 1880	As owner	Wilton Junction.			
1489	Cole, D L	July 8, 1880	As owner	Bussey	Oskaloosa	Mar. 23, 1897	
1491	Clemmer, J. J	June 14, 1880	As owner	Cresco.			
1518	Coy, James W	July 24, 1880	As owner	Dubuque.			
1609	Clark, Edwin A.	Aug. 27, 1880	As owner	Davenport	Princeton	June 17, 1896	
1670	Carroll, J. M.	Sept 17, 1880	By examination	Pomeroy	Laurens	July 2, 1888	
1688	Campbell, William J.	Aug 26, 1880	By examination	Fort Dodge.			
1703	Carmichael, J. H.	Aug. 24, 1880	By examination	Davenport	Emmetsburg	Sept. 12, 1888	
1809	Chamberlain, L.	Aug. 30, 1880	By examination	Marion.	Des Moines	April 29, 1885	Out of business.
2126	Coakley, J. W.	May 27, 1881	By examination	Mount Etna.			
2128	Cochran, M. H.	May 20, 1881	By examination	Morning Sun.			
2135	Corf, Frederick	May 26, 1881	By examination	Union.			
2168	Critz, Sylvester F.	July 13, 1881	By examination	Riverside	Riverside	Jan. 20, 1887	
2178	Camp, Eli R	July 25, 1881	By examination	Keokuk.			
2194	Christy, W. D.	Aug. 19, 1881	By examination	Afton	Shannon City	June 10, 1889	
2204	Conger, E J.	Aug. 10, 1881	By examination	Manchester.			
2229	Cary, George T.	Aug 26, 1881	By examination	Lewis	Grant	Dec. 5, 1883	
2234	Cogswell, S G	Sept. 1, 1881	By examination	Ottumwa	Des Moines	Nov. 29, 1889	
2265	Cameron, C. E.	Nov. 4, 1881	By examination	Storm Lake	Alta	Dec. 7, 1883	
2351	Coquillette, W. E.	Feb. 25, 1882	By examination	Nugent's Grove			In Illinois.
2421	Channell, L. M	April 28, 1882	By examination	Montezuma.			
2448	Crasper, Jule H.	April 7, 1883	By examination	Hampton.			
2449	Crissinger, J. C	June 6, 1882	By examination	Farnhamville.			
2561	Corkhill, Charles E.	Jan. 2, 1882	By examination	Bloomfield	Oskaloosa	May 18, 1896	
2566	Connor, Arthur F.	Jan. 10 1883	By examination	Avoca.			
2622	Cunningham, A. S	April 24, 1883	By examination	Coggon			In Renwick.
2685	Clopper, W. T.	Sept. 12, 1883	By examination	Le Mars	Larchwood	Nov. 4, 1892	Palo, Ill.
2691	Cocke, V. W	Oct. 22, 1883	By examination	Lake City.			
2716	Cornish, J. V	Feb. 1, 1884	By examination	Wall Lake.			
2740	Camp, John W.	April 15, 1884	By examination	Council Bluffs.			
2775	Campbell, L.	June 27, 1884	By examination	Chillicothe.			
2792	Campbell, C. E.	Aug. 5, 1884	By examination	Collins.			
2817	Clark, S W	Nov 24, 1884	By examination	Magnolia	(Magnolia only).		
2872	Conley, H. C.	April 21, 1885	By examination	Moingona			Out of business.
2949	Connolly, William	Dec. 1, 1885	By examination	Cresco			
2972	Chase, Willard	Feb. 19, 1886	By examination	West Liberty			Out of business.
2974	Cole, George T	Feb. 2, 1886	By examination	Greene.			
2990	Crady, Edward E.	Mar. 9, 1886	By examination	Cherokee	Sioux City	July 30, 1888	
3005	Cole, I G.	May 13, 1886	By examination	Williams	Dayton	July 9, 1886	
3008	Craig, J. W	May 18, 1886	By examination	Lohrville			Out of business.
3071	Cuplin, Pascal P.	Sept. 7, 1886	By examination	Emmetsburg	West Bend	Mar. 29, 1889	
3081	Cope, W. L.	Oct. 5, 1886	By examination	Atalissa	Muscatine	Jan. 5, 1888	
3083	Colvin, A W.	Oct. 5, 1886	By examination	Manchester	Armstrong	Dec. 1, 1892	
3096	Capwell, D. H.	Nov. 2, 1886	By examination	Garrison			Out of business.
3112	Cameron, Ira F.	Jan. 4, 1887	By examination	Keswick.			
3138	Core, George W.	Feb. 15, 1887	By examination	Rolfe.			
3280	Cary, C. A.	July 13, 1887	By examination	Ames	Auburn, Ala.		
3325	Chatterlin, S. E.	Oct. 4, 1887	By examination	Winterset.			
3356	Childs, Ed. W	Dec. 16, 1887	By examination	Des Moines	Villisca	April 16, 1897	
3386	Clark, F. B.	Feb. 27, 1888	Graduate	Ottumwa.			

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
3389	Carmichael, J. H.	Feb. 20, 1888	By examination	Rockwell City	Ashton	Jan. 25, 1890	
3400	Clarkson, Robert A.	Feb. 22, 1888	By examination	Cedar Rapids			In Illinois.
3434	Cunningham, T. C.	April 4, 1888	By examination	Clinton	Clinton	April 18, 1889	
3481	Cavendar, B. I.	June 29, 1888	By examination	Clarinda	Randolph	June 29, 1894	
3509	Connors, John	Aug. 21, 1888	By examination	Mapleton.			
3515	Chapin, George C.	Aug. 30, 1888	By examination	Hastings.			
3533	Cutler, C. F.	Sept. 18, 1888	By examination	Deep River.			
3547	Chapman, C. C.	Oct. 30, 1888	By examination	Des Moines	Des Moines	Aug. 24, 1895	
3549	Cummings, I. P.	Oct. 29, 1888	By examination	Sioux City.			
3602	Cox, John C.	Feb. 19, 1889	By examination	Washington	Burlington	Mar. 2, 1892	
3613	Cole, James H.	Mar. 6, 1889	By examination	Thurman.			
3723	Collins, Carrie S.	Sept. 3, 1889	By examination	Garner.			
3628	Cook, Charles A.	Mar. 19, 1889	By examination	New Hampton	Sibley	Mar. 5, 1895	
3637	Cagwin, Joel C.	April 9, 1889	By examination	Boone.			
3647	Chase, Charles V.	April 22, 1889	Graduate	Davenport.			
3651	Coffman, W. T.	May 7, 1889	By examination	South English.			
3653	Cox, G. W.	May 7, 1889	By examination	Council Bluffs	Des Moines	Mar. 23, 1893	
3660	Cole, Victor F.	May 21, 1889	By examination	Dayton	Jewell Junction	July 17, 1895	
3680	Carl, F. F.	June 18, 1889	By examination	Nichols.			
3710	Cooper, B. F.	Aug. 20, 1889	By examination	Clinton	Muchakinock	Nov. 4, 1892	
3733	Cottrell, George D.	Sept. 17, 1889	By examination	Spencer.			
3764	Camp, George F.	Nov. 5, 1889	By examination	Council Bluffs.			
3784	Culbertson, J. W.	Dec. 16, 1889	By examination	Winfield	Center Point	July 2, 1896	
3788	Cobb, Edward T.	Dec. 19, 1889	By examination	West Union	Dickens	Mar. 25, 1897	
3797	Chandler, C. H.	Jan. 7, 1890	By examination	Rodney	Cedar Rapids		Out of business.
3814	Conk, Charles H.	Jan. 29, 1890	By examination	Gilman	Bloomfield	June 17, 1890	
3819	Connoly, J. P.	Feb. 4, 1890	By examination	Cresco.			
3839	Campbell, D. C.	Mar. 4, 1890	By examination	Crawfordsville.			
3862	Collins, D. C.	Mar. 1, 1890	Graduate	Fairfield.			
3875	Cole, Charles F.	April 15, 1890	By examination	Dayton.			
3919	Chadwick, J. B.	Aug. 5, 1890	By examination	Salix.			
3974	Cochran, W. L.	Jan. 13, 1891	By examination	Burlington.			
3984	Cole, W. F.	Feb. 3, 1891	By examination	Renwick	Jewell Junction	Sept. 20, 1894	
3987	Carver, W. F.	Feb. 5, 1891	By examination	Winterset	Murray	Aug. 15, 1893	
4030	Clark, John W.	April 7, 1891	By examination	Moulton	Centerville	Aug. 7, 1891	
4038	Cunningham, C. L.	Mar. 26, 1891	By examination	Des Moines	Keokuk	Aug. 28, 1895	
4043	Curtis, H. E.	May 1, 1891	By examination	Menlo			Out of business.

4063	Clingan, William A.	June 2, 1891	Graduate	Sioux City			Left the state.
4073	Crew, A. S.	June 2, 1891	By examination	Salem.			
4095	Coltrane, M. B	Aug. 5, 1891	By examination	Thayer	Afton	Jan. 14, 1893	
4098	Crowe, Will	Aug. 11, 1891	By examination	Clermont.			
4155	Cowan, John D.	Dec. 8, 1891	By examination	Iowa Falls.			
4168	Clements, I. W.	Feb. 1, 1892	By examination	Marengo	Marengo	Dec. 31, 1892	
4176	Coveny, T. H	Feb. 8, 1892	By examination	Knoxville	Belle Plaine	July 1, 1895	
4185	Carmichael, C. C.	Feb. 23, 1892	By examination	Ashton	Everly	Oct 1, 1893	
4186	Carpenter, O. O.	Feb. 26, 1892	By examination	Galesburg	Des Moines	April 7, 1892	
4193	Carden, George R.	Mar. 1, 1892	By examination	Burlington	Albia	Mar. 28, 1893	
4209	Collins, E. C.	Mar. 7, 1892	Graduate	Red Oak.			
4201	Cox, James Ed	Mar. 12, 1892	Graduate	Des Moines	Ruthven	April 13, 1897	
4200	Coppock, William	April 5, 1892	By examination	Mason City		——— —, 1895	
4210	Cozad, C. B.	April 5, 1892	By examination	Prairie City.			
4229	Campbell, R. M	May 5, 1892	By examination	Ottumwa	Ottumwa	June 14, 1893	
4243	Cuplin, H. S.	June 7, 1892	By examination	West Bend.			
4248	Calkins, H. G.	June 7, 1892	By examination	Anita.			
4253	Culverson, F. P	June 24, 1892	By examination	Greenfield.			
4271	Carver, E. J	July 12, 1892	By examination	Collins	Colo	Oct. 5, 1895	
4275	Corey, C. S.	July 20, 1892	By examination	Lehigh.			
4308	Cole, H. B	Sept. 13, 1892	By examination	Renwick.			
4328	Colgan, F. L.	Nov. 1, 1892	By examination	Conrad	Gilmore City	April 26, 1895	
4326	Curtis, H. M	Nov. 8, 1892	By examination	Churdan	Packwood	April 16, 1897	
4333	Carris, E. C	Nov. 1, 1892	By examination	Des Moines	Washington	Feb. 18, 1895	
4351	Converse, L. E	Dec. 27, 1892	By examination	Fort Dodge	Waverly	Feb. 9, 1893	
4361	Campbell, L. R.	Dec. 15, 1892	By examination	Davenport.			
4362	Coad, James A.	Jan. 10, 1893	By examination	Hull.			
4363	Casavaw, George N	Jan. 17, 1893	By examination	Montezuma	Sac City	June 2, 1893	
4382	Crain, W. L	Feb. 14, 1893	By examination	Lone Tree	Cushing	May 14, 1894	
4388	Cowles, V. D.	Feb. 28, 1893	By examination	Des Moines.			
4406	Corfe, William N	Mar. 6, 1893	By examination	Union.			
4416	Cozine, Irvin V	Mar. 8, 1893	By examination	Clinton.			
4423	Crabbe, A. N	Mar. 8, 1893	By examination	Menlo.			
4427	Campbell, R. W	April 3, 1893	By examination	Keokuk			In Memphis, Mo.
4429	Coppock, Wood	April 4, 1893	By examination	North English	Victor	Sept. 20, 1895	
4439	Carlisle, Glenn M.	April 22, 1893	By examination	Muscatine	Buffalo	Oct. 12, 1894	
4454	Curtis, George C.	May 9, 1893	By examination	Atlantic.			
4456	Clemmer, P. C.	May 2, 1893	By examination	Cresco.			
4465	Clark, G. N.	June 5, 1893	By examination	Parkersburg.			
4466	Cunningham, C. E.	June 5, 1893	By examination	Oskaloosa	Muchakinock	Oct. 10, 1896	
4483	Carman, C. P	July 5, 1893	By examination	Cedar Rapids.			
4489	Cady, Franc C.	Aug. 1, 1893	By examination	Atlantic.			
4490	Carton, John A.	Aug. 1, 1893	By examination	Ackley	Britt	Feb. 7, 1894	
4501	Chapman, J. M	Aug. 9, 1893	By examination	Princeton	Mapleton	Mar. 9, 1896	
	Cottam, C. M	Aug. 10, 1895	Graduate	Marshalltown	St. Charles	Aug. 10, 1895	
4505	Cronk, Alfred P.	Aug. 29, 1893	By examination	Montour	Bancroft	Jan. 15, 1895	
4557	Cooper, George E.	Dec. 5, 1893	By examination	Peterson.			
4563	Cushman, R. A.	Jan. 2, 1894	By examination	Sanborn.			
4572	Childress, M.	Feb. 6, 1894	By examination	Unionville.			
4593	Carse, G. H.	Mar. 6, 1894	By examination	Pleasant Plain	Packwood	Sept. 26, 1895	

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
4595	Cooke, F. W.	Mar. 6, 1894	By examination.	Swaledale.			
4596	Conklin, W. S.	Mar. 6, 1894	By examination.	Des Moines.			
4610	Culver, Edgar R.	Mar. 6, 1894	By examination.	Sibley	Matlock	Sept. 16, 1895	
4627	Coad, N. G. O.	April 3, 1894	By examination.	Hull.			
4634	Cole, Mrs. Ella C.	April 17, 1894	By examination.	Renwick.			
4664	Carpenter, Fred F.	June 19, 1894	By examination.	Des Moines.			
4675	Cassaday, Leon M.	June 5, 1894	By examination.	Denison.			
4681	Crow, Raymond E.	Oct. 12, 1893	By examination.	Grand Junction.			
4728	Cleasby, A. B.	Sept. 4, 1894	By examination.	Correctionville.	Clinton	Mar. 30, 1897	
4750	Crossman, Wm. P.	Oct. 2, 1894	By examination.	Toledo	Tama	Jan. 14, 1896	
4764	Cope, Francis C.	Oct. 30, 1894	By examination.	Wilton Junction	Davenport	Mar. 5, 1895	
4768	Cole, Omer L.	Nov. 13, 1894	By examination.	Cedar Rapids.			
4776	Craddick, W. W.	Nov. 13, 1894	By examination.	Knoxville.			
4783	Crosley, Mont.	Dec. 4, 1894	By examination.	Laurens	Hubbard	July 28, 1896	
4785	Coreny, J. Frank	Dec. 4, 1894	By examination.	Chelsea	Clinton.	Feb. 2, 1897	
4818	Collins, T. D.	Feb. 5, 1895	By examination.	Emmetsburg	Graettinger	Feb. 26, 1895	
4829	Cloe, John W.	Mar. 5, 1895	By examination.	Knoxville.			
4434	Cattin, F. S.	Mar. 5, 1895	By examination.	Iowa Falls	Laporte City	July 16, 1896	
4881	Critz, J. P.	May 7, 1895	By examination.	Riverside.			
4892	Cilley, Will W.	June 5, 1894	By examination.	Wapello	Morning Sun	Jan. 31, 1895	
4894	Chesebra, Nellie	June 4, 1895	By examination.	Jesup			
4901	Cavanaugh, E. L.	July 2, 1895	By examination.	Vinton.			
4918	Countermine, I. H.	Aug. 9, 1895	By examination.	Marcus.	Sioux City	Oct. 2, 1895	
4926	Corfe, Edw. W.	Sept. 10, 1895	By examination.	Union.			
4927	Conner, Edw. E.	Sept. 10, 1895	By examination.	Livermore.			
4954	Clemens, W. C.	Dec. 3, 1895	By examination.	Wapello.			
4956	Cooke, S. R.	Dec. 3, 1895	By examination.	Wall Lake.			
4999	Collins, E. E.	Feb. 4, 1896	By examination.	West Union	Winthrop	Aug. 8, 1896	
5005	Carpenter, C. M.	Feb. 25, 1896	By examination.	Des Moines	Mason City.		
5007	Connelly, F. L.	Mar. 3, 1896	By examination.	Agency.			
5066	Carmichael, Lola	April 21, 1896	By examination.	Ashton.			
5095	Carr, O. G.	June 2, 1896	By examination.	Moulton	Unionville	June 20, 1896	
5096	Conger, H. G.	June 2, 1896	By examination.	Manchester.			
5128	Corwin, J. W.	Jan. 3, 1894	By examination.	Milton	Kinross	June 13, 1897	
5134	Copeland, Jay	Dec. 1, 1896	By examination.	Fairfield.			
5147	Cantwell, J. Y.	Sept. 2, 1896	Graduate	Davenport	Maquoketa	Mar. 18, 1897	
5154	Coon, L. B.	Oct. 6, 1896	By examination.	Des Moines.			

5164	Carter, J. H.	Nov. 10, 1896	By examination	Des Moines	Leon	Mar. 19, 1897	
5165	Carson, Sade M.	Nov. 10, 1896	By examination	New Sharon.			
5178	Collins, A. R.	Dec. 1, 1896	By examination	Traer	Oelwein	June 25, 1897	
5212	Cahill, J. L	Mar. 2, 1897	By examination	Buffalo Center	Thompson	June 4, 1897	
5226	Cooper, Zada	Mar. 9, 1897	By examination	Quasqueton.			
5260	Cook, Blanche E	May 4, 1897	By examination	Casey.			
5287	Crawford, C. A.	July 6, 1897	By examination	Bristow.			
5288	Curran, W. D.	July 6, 1897	By examination	Morning Sun.			
77	Dunlavy, James	June 8, 1880	As principal	Stiles.			
205	Dierkes, Chas	June 21, 1880	As owner	Bellevue.			
220	Diehl, Philip H.	June 15, 1880	As owner	Le Mars.			
240	Dunbar, George B	June 12, 1880	As owner	Center Point.			
762	Davis, Mahlon J	June 7, 1880	As owner	Lewis.			
868	Deutschman, A	June 5, 1880	As assistant	Muscatine.			
889	Dawkins, Benj. M	June 17, 1880	As owner	Mineral Ridge.			
898	Dean, C. A.	June 14, 1880	As owner	Monona.			
917	Dunn, John W.	July 1, 1880	As owner	Derby.			
958	Durant, A. H	July 3, 1880	As owner	Algona.			
959	Durant, H.	July 3, 1880	As owner	Algona.			
992	Duffield, Geo. W.	June 26, 1880	As principal	Centerville.			
1028	Doty, Elmer A	June 19, 1880	As owner	Oxford.			
1060	Douglass, R. N	June 7, 1880	As owner	Postville.			
1587	Dalrymple, A. L.	July 22, 1880	As owner	Monroe.			
1527	Dougherty, J. B.	July 27, 1880	As owner	Muscatine.			
1584	Dumont, T. A	Aug. 7, 1880	As owner	Dumont.			
1658	DeHaven, J. C.	Aug. 30, 1880	As owner.	Council Bluffs.			
1692	Duke, Charles D	Aug. 2, 1880	By examination	Marshalltown	Des Moines	Jan. 23, 1890	
1702	Down, E. B.	Aug. 9, 1880	By examination	Lewis.			
1903	Davis, M W.	July 30, 1880	By examination	Iowa City.			
2243	DeKalb, Benj. D	Sept. 28, 1881	By examination	DeKalb.			
2262	Davis, J. D.	Nov. 1, 1881	By examination	Nassua			Out of business.
2324	Dosh, Edward	Dec. 27, 1881	By examination	Guthrie Center.			
2329	Doty, C. W.	Jan. 24, 1882	By examination	Newell			In Nebraska.
2433	DeWitt, C. H	May 10, 1882	By examination	Lucas	Glenwood	May 28, 1890	
2554	DeWitt, W W.	Dec. 19, 1882	By examination	Peterson.			
2565	Doolittle, W. A	Jan. 9, 1883	By examination	Columbus Junction			In Sabetha, Kas.
2754	David, J. W	April 24, 1884	By examination	Alden.			
2847	Davis, Will A	Mar. 9, 1885	By examination	Ferguson	Jewell Junction	Mar. 23, 1897	
2863	Douglass, C. W	April 21, 1885	By examination	Calmar	West Union	June 27, 1890	
2891	Douglas, E. F.	June 5, 1885	By examination	Dysart.			
2900	Driscoll, Jer. E	July 3, 1885	By examination	Davenport.			
2922	DeKruif, P J	Sept. 9, 1885	By examination	Orange City.			
2968	Draper, J. S.	Jan. 8, 1886	By examination	Boone.			
2970	Dean, Frank A	Feb. 17, 1886	By examination	Dunlap.			
3011	Dickey, E. L.	May 19, 1886	By examination	Marshalltown	Spencer	May 14, 1893	
3032	De Marsha, F. E	June 15, 1886	By examination	Radcliffe.			
3034	Dennison, John O	June, 15, 1886	By examination	Maquoketa	Bellevue	Jan. 10, 1894	
3052	Dyer, Henry W	July 20, 1886	By examination	Pomeroy	Mapleton	Feb. 2, 1897	
3191	Doan, H. O.	Mar. 1, 1887	By examination	Humboldt.			

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
3291	Dingman, G. W., Jr.	Aug. 15, 1887	By examination	Urbana.			
3316	Donalson, W. B.	Sept. 19, 1887	By examination	Salem	....	....	In Pierre, Neb.
3321	Dingley, Frank W	Sept. 27, 1887	By examination	Algona.			
3318	Damman, Fred W	Sept. 20, 1887	By examination	St Anthony	Primghar	May 8, 1889	
3349	Deakin, James W.	Nov. 29, 1887	By examination	Des Moines	Tipton	Nov. 2, 1889	
3393	Dunkelberg, E. E.	Feb. 24, 1888	By examination	Frederica	Tripoli.		
3398	Davis, W. B.	Feb. 22, 1888	By examination	Lucas			
3459	Dos , G. W	May 15, 1888	By examination	Lewis.	Brighton	June 4, 1890	
3507	Dostal, Joseph L.	Aug. 20, 1888	By examination	Cedar Rapids.			
3570	Duffield, S. B	Dec. 28, 1888	By examination	Mason City.			
3588	Diddy, Claude A	Jan. 29, 1889	By examination	Adel	Redfield	June 13, 1890	
3605	Davis, G. G	Feb. 5, 1889	By examination	Denison	....	....	In Illinois.
3639	Dennert, Frank.	April 9, 1889	By examination	Dubuque.			
3642	Dewey, William H	April 16, 1889	By examination	Moville.			
3643	Dodd, A. B	April 16, 1889	By examination	Toledo	Charles City	Mar. 2, 1893	
3652	De Lano, A. H	May 7, 1889	By examination	Lone Tree.			
3705	Dunkle, W. B.	Aug. 10, 1889	By examination	Gilman.			
3750	Doyle, C. E	Oct. 14, 1889	By examination	Logan	Hamburg.		
3786	Dean, Alfred F	Dec. 16, 1889	By examination	Dunlap	Rockwell City	June 10, 1892	
3791	Durrette, R. G	Dec. 30, 1889	By examination	Mapleton	Des Moines	Feb 28, 1891	
3792	Davis, Oscar	Jan. 2, 1890	By examination	Audubon	Des Moines	April 20, 1895	
3811	Doan, Frank L	Jan. 29, 1890	By examination	Cresco	Waucoma	April 8, 1897	
3821	Doudna, Charles B.	Feb. 4, 1890	By examination	Bayard.			
3842	Downs, A W	Mar. 4, 1890	By examination	Moulton	Seymour	Dec. 6, 1896	
3849	Devendorf, W. A.	Mar. 18, 1890	By examination	Union	Story City.	Sept. 18, 1893	
3897	Davis, James P	June 6, 1890	By examination	Bonaparte.			
3956	Dayton, D. D	Nov. 4, 1890	By examination	Rock Valley	Lime Springs	Dec. 30, 1896	
3959	De Neni, John T	Nov. 11, 1890	By examination	George.			
3990	Douglass, S. A	Feb. 11, 1891	By examination	Des Moines	Adel	Nov. 30, 1891	
3991	Dodson, William F.	Feb. 13, 1891	By examination	Shenandoah	Blanchard	Mar. 9, 1896	
3997	Davis, George S.	Feb. 24, 1891	By examination	Council Bluffs.			
4012	Downs, Horace S	Mar. 7, 1891	By examination	Collins	Baxter	July 8, 1891	
4029	Dittmore, C. L.	April 7, 1891	By examination	Colesburg	Colesburg	—— — 1894	Out of business.
4074	Deunett, A. L.	June 9, 1891	By examination	South Omaha, Neb.	....	—— — 1895	
4138	Dunlavy, H. F	Nov. 10, 1891	By examination	Bedford.			
4183	Diddy, Cad	Feb. 17, 1892	By examination	Perry	Des Moines	Sept. 20, 1893	
4207	Doyle, William J	April 1, 1893	By examination	Davenport.			

4334	Dorr, O. H	May 2, 1892	By examination	Sioux City		Nov. 6, 1893	
4365	Diebner, W. F	July 6, 1892	By examination	Wheatland		—— — 1895	
4368	Dobson, Mrs. M. H	July 7, 1892	By examination	Le Grand.			
4376	Dorgan, John J	July 20, 1892	By examination	Davenport.			
4393	David, Laura B.	Aug. 17, 1892	Graduate	Alden	Radcliffe.		
4357	Dale, John R	Jan. 3, 1893	By examination	Waterloo	Fremont	June 1, 1894	
4387	Davis, Frank R	Feb. 28, 1893	By examination	Des Moines	Bondurant	Dec. 26, 1895	
4404	Duffield, O. J	Mar. 18, 1893	By examination	Centerville.			
4483	Dixon, George W	July 5, 1893	By examination	Colfax			In Texas.
4495	Dauquard, Theo	Aug. 1, 1893	By examination	Davenport.			
4536	Dittmer, Adolph C. H	Oct. 3, 1893	By examination	Ft. Dodge.			
4563	Drummond, O. M	Dec. 19, 1893	By examination	Mt. Pleasant.			
4582	De Smith, C. F	Feb. 6, 1894	By examination	Charles City.			
4585	De Cow, Frank H	Feb. 6, 1894	By examination	Woodbine			Kansas City, Mo.
4597	Delander, Charles A	Feb. 27, 1894	By examination	Des Moines	Gowrie	Dec. 20, 1895	
4636	Dick, O. K	April 17, 1894	By examination	Des Moines	Webster City	Nov. 25, 1895	
4648	De Witt, C. E	May 1, 1894	By examination	Wyoming			Nebraska.
4652	Duncan, O. F	May 1, 1894	By examination	Mediapolis	Burlington	July 9, 1896	
4678	Dixon, John S	June 5, 1894	By examination	Mason City.			
4726	Dixon, F. A	Sept. 4, 1894	By examination	Lohrville	Shenandoah	Jan. 6, 1895	
4766	Duyer, J. C	Nov. 6, 1894	By examination	Des Moines.			
4769	Dexheimer, W. F	Nov. 7, 1894	By examination	Spirit Lake.			
4794	Donnelly, William	Jan. 1, 1895	By examination	Ryan.			
4838	Denton, Robert A	Feb. 15, 1895	By examination	Manchester.			
4830	Davis, Bert	Mar. 5, 1895	By examination	Afton			Nebraska.
4851	Drake, Clyde L	Mar. 26, 1894	By examination	Hartley			Colorado.
4864	Clarke, Anna Z	April 9, 1895	By examination	What Cheer	Oskaloosa.		
4877	Davies, W. T. T	May 7, 1895	By examination	Sibley	Elma	Sept. 4, 1896	
4899	Duncan, James H	July 2, 1895	By examination	Decorah.			
4904	Diamond, J. A.	June 25, 1895	By examination	Princeton	Le Claire	Aug. 3, 1895	
4929	Davis, C. R	Sept. 10, 1895	By examination	Donnelson.			
4945	Day, Geo. W	Nov. 7, 1895	By examination	Rolfe	Plover	Dec. 19, 1896	
4981	Daugherty, A. E	Jan. 7, 1896	By examination	Colo	Livermore	April 28, 1896	
5012	Dooly, E. P	Mar. 3, 1896	By examination	Perry	Polk City	Feb. 11, 1897	
5063	Dillon, J. H	April 7, 1896	By examination	Jerome			
5036	Durrette, Ella B	Mar. 7, 1896	By examination	Des Moines.			
5086	Davis, Ella	May 5, 1896	By examination	Malcom.			
5101	Dillon, Geo. W	June 16, 1896	Graduate	Northwood.			
5123	Dalander, E. P	Aug. 4, 1896	By examination	Madrid.			
5126	Demaray, C. H	Aug. 4, 1896	By examination	Osage	Charles City	Mar. 23, 1897	
5173	**DeLange, James**	Dec. 1, 1896	By examination	Remsen.			
63	**Evans, John M**	June 7, 1890	As owner	Gowrie.			
330	Etzel, John L	June 18, 1880	As owner	Clear Lake.			
443	Emeiss, Hugo A	June 17, 1880	As owner	Davenport.			
500	Eddy, William M	June 2, 1880	As owner	Marengo.			
595	Edwards, M. G	June 9, 1880	As owner	Glenwood.			
687	Eaton, J. E	June 8, 1880	As assistant	Keota.			
994	Emery, J. F	June 7, 1880	As owner	Northwood	St. Ansgar	July 9, 1896	
1004	Elliott, W. D	June 16, 1880	As owner	Ottumwa.			

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
1029	Evans, William J	June 18, 1890	As owner	Osage.			
1234	Eldridge, C. G	June 2, 1880	As owner	Sabula.			
1415	Ennis, William W	July 13, 1880	As principal	Ottumwa.			
1596	Everett, F. J	Aug. 9, 1880	As owner	Fairbank.			
1645	Eslick, Thomas B	Aug. 24, 1880	As owner	Lehigh.			
1710	Ellis, Clark	July 31, 1880	By examination	Little Sioux.			
1725	Elliott, John A	Sept. 10, 1880	As owner	Clarion.			
1781	Evans, Warren B	Sept. 23, 1880	As owner	Dow City	Arion	Dec. 12, 1894	
1818	Erwin, J. W	Oct. 25, 1880	As owner	North English			Out of business.
1967	Everett, F. G	Jan. 18, 1881	As assistant.	Fairbank.			
2122	Elliott, W. V	April 30, 1881	By examination	Knoxville.			
2350	Ellis, George F	Feb. 17, 1882	By examination	Grundy Center.			
2469	Engeldinger, P	June 5, 1882	By examination.	Sigourney	Hedrick	May 12, 1883	
2528	Ellis, G. V	Aug. 30, 1882	By examination	Calliope	Hawarden		Out of business.
2642	Ensign, Charles	June 5, 1883	By examination	Scranton			Out of business.
2908	England, L. E	Aug. 4, 1885	By examination	Grand Junction	Gilmore City	Mar. 25, 1886	
2984	Engbartson, R	Mar. 2, 1886	By examination	Decorah.			
3012	Earle, W. C	June 1, 1886	By examination	Waukon.			
3215	Eaton, F N	April 6, 1887	By examination	Casey	Valley Junction	Feb. 16, 1893	
3239	Elson, Hugh	May 17, 1887	By examination	Des Moines			In Missouri
3283	Emery, George M	July 26, 1887	By examination	Mason City	Northwood	Sept. 14, 1887	
3345	Ericsson, G. B	Nov. 14, 1887	By examination	Essex	Red Oak	Aug. 15, 1895	
3429	Elliott, S. S	April 2, 1888	By examination	Missouri Valley	Missouri Valley	Mar. 31, 1895	
3558	Eich, Joseph F	Nov. 20, 1888	By examination	Carroll	Alden	Feb. 16, 1897	
3582	Ehle, Chauncey E	Jan. 15, 1889	By examination	Marshalltown.			
3662	Eaton, Claude L	May 21, 1889	By examination	Strawberry Point	Lamont	May 15, 1894	
3690	Eckerman, H. F. L	July 16, 1889	By examination	Avoca			In Nebraska.
3742	Engleen, C. J	Oct. 1, 1889	By examination	Ogden	Des Moines	Dec. 15, 1893	
3753	Evans, Paul W	Oct. 15, 1889	By examination	Malvern	Des Moines	Nov. 26, 1889	In Nebraska.
3812	Euler, Frank	Jan. 29, 1890	By examination	Iowa City.			
3918	Elwood, James D	Aug. 5, 1890	By examination	Gladbrook	Van Horne	Dec. 20, 1894	
4037	Egli, Eugene E	Mar. 26, 1891	By examination	Onawa.			
4070	Elder, A. T	June 2, 1891	By examination	Marshalltown.			
4114	Elder, William E	Sept. 1, 1891	By examination	Tingley.			
4158	Evans, Wilber H	Dec. 21, 1891	By examination	Marshalltown.			
4190	Eastburn, W. W	Mar. 1, 1892	By examination	Hedrick		Dec. 22, 1894	
4193	Eade, J. W	Mar. 1, 1892	By examination	Pilot Mound	Des Moines	Oct. 31, 1894	

4321	Eaton, Harry E.	April 14, 1893	Graduate	Essex.			
4348	Ellsworth, E. E.	Jan. 3, 1893	By examination	Eldora.			
4365	Edwards, Bert	Jan. 24, 1893	By examination	Moulton	Moravia	June 11, 1897	
4403	Elerick, J. S	July 12, 1893	By examination	Keosauqua	Muchakinock	April 12, 1894	
4537	Elliott, George Fred	Nov. 3, 1893	By examination	Boone	Frazer	June 1, 1896	
4630	Evans, J. W	April 10, 1894	By examination	Clinton.			
4644	Emerson, R. W	April 20, 1894	By examination	Cedar Rapids.			
4684	Erb, B. F.	June 26, 1894	By examination	Cambridge.			
4738	Edwards, J. E.	Sept. 10, 1894	By examination	Eagle Grove.			
4780	Elder, Alice Waugh	Dec. 4, 1894	By examination	Tingley.			
4811	Erickson, N. L	Feb. 5, 1895	By examination	Des Moines	Milford	April 24, 1896	
4887	Eckstein, E. S	May 14, 1895	By examination	Chester.			
4964	Epperly, C. C	Dec. 17, 1895	By examination	Newell	Rolfe	Mar. 24, 1896	
5012	Easton, E. K.	Mar. 3, 1896	By examination	Manson	Germania	May 18, 1896	
5028	Emmert, L. Z	Mar. 31, 1896	By examination	Des Moines.			
5040	Ernst, C. C.	April 7, 1896	By examination	Iowa City	Wayland	Nov. 23, 1896	
5111	Everett, Orion	July 7, 1896	By examination	Tama	Marshalltown	Feb. 10, 1897	
5275	**Eigler, F. H**	May 27, 1897	Graduate	Defiance.			
142	**Fuller, Charles M.**	June 12, 1880	As assistant	Keokuk.			
238	Freed, David A	June 24, 1880	As owner	Redfield.			
338	Flammant, M	June 20, 1880	As owner	Mineola.			
480	Fraatz, Fred C	June 3, 1880	As assistant	Dubuque.			
555	Finke, Walter H	June 4, 1880	As owner	Elgin.			
634	Frost, Lewis D	June 9, 1880	As owner	Harlan.			
671	Foy, Edward W	June 3, 1880	As owner	Jefferson.			
1045	Farnham, L. H	June 21, 1880	As owner	Portlandville	Spirit Lake	Oct. 31, 1893	
1063	Forsythe, William D.	July 1, 1880	As owner	Pella.			
1216	Fagan, Horace M	June 4, 1880	As owner	Shelby.			
1341	Foray, William W	June 3, 1880	As owner	Waterloo.			
1568	Freeman, E. C.	July 29, 1880	As assistant	Jefferson.			
1681	Fletcher, W. G	July 27, 1880	By examination	Glenwood	Williamsburg	July 9, 1885	
1751	Fox, Jacob G	Aug. 6, 1880	As owner	Waubeek.			
1788	French, Charles H	Aug. 10, 1880	By examination	Cedar Rapids.			
1816	Finster, Henry J	Oct. 25, 1880	As owner	Steamboat Rock.			
1855	Fitzgerald, M.	Sept. 15, 1880	By examination	Liscomb	Boone	Aug. 3, 1887	
1866	Fretz, Menzo	Oct. 22, 1880	By examination	Avoca	Harlan	Oct. 18, 1887	
1872	Foster, W. E.	July 30, 1880	By examination	Glidden.			
1925	Frost, C. E.	Nov. 29, 1880	By examination	Oxford	Rhodes	Sept. 19, 1882	
1932	Fellows, Henry	Nov. 18, 1880	By examination	Colfax			Out of business.
2014	Fiddler, J. D.	Feb. 14, 1881	By examination	Iowa Falls	Williams	April 22, 1886	
2095	Frank, E. S	Mar. 1, 1881	By examination	Livermore.			
2147	Fischer, H.	June 1, 1881	By examination	Pomeroy			Out of business.
2212	Foltz, George F.	Sept. 23, 1881	By examination	Coon Rapids	Iowa City	Oct. 4, 1892	
2313	Feenstra, J. B. H.	Jan. 18, 1882	By examination	Arcadia.			
2315	Fox, Frank	Dec. 19, 1881	By examination	Winthrop			Out of business.
2690	Field, G. W.	Oct. 16, 1883	By examination	Thor			Out of business.
2727	Foley, W. J	Mar. 8, 1884	By examination	Dayton	Manson	Jan. 20, 1886	
2834	Forsyth, Robert	Feb. 2, 1885	By examination	What Cheer	Jerome	Aug. 17, 1893	
2944	Freeks, Ed. M	Nov. 17, 1885	By examination	Parkersburg	Rock Rapids	Mar. 25, 1892	Out of business.

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
3037	Findley, Will J.	June 26, 1886	By examination	Atlantic.			
3043	Franken, Ed.	Aug. 6, 1886	As graduate.	Sigourney.			
3053	Farr, H. S	July 20, 1886	By examination	Madrid.			
3054	Farnsworth, D. W.	July 20, 1886	By examination	Galva.			
3087	Fulton, A. H.	Oct. 6, 1886	By examination	Des Moines	Knovville	Nov. 24, 1893	
3106	Foersterling, H.	Dec. 7, 1886	By examination	Dubuque			Chicago, Ill.
3152	Fisher, Lewis A.	Feb. 25, 1887	By examination	West Union	Hawkeye	Sept. 11, 1894	
3153	Foster, Horatio O.	Feb. 28, 1887	By examination	Creston			Out of business.
3166	Funk, Samuel G.	Mar. 15, 1887	By examination	Panora	Yale	Mar. 27, 1890	
3210	Freeman, J. H.	April 5, 1887	By examination	Jefferson	Prairie City	July 5, 1887	
3229	Fowler, I. D.	April 17, 1887	By examination	Lansing			Out of business.
3251	Funk, Edgar M	May 26, 1887	By examination	Hampton.			
3263	Fulton, John L	June 21, 1887	By examination	Clarksville			In Wisconsin.
3426	Franz, F. W.	April 2, 1888	Graduate	Sioux City.			
3535	Foster, F. E.	Sept. 18, 1888	By examination	Glidden	Scranton	May 8, 1891	
3565	Fritz, William I.	Dec. 4, 1888	By examination	Lenox	Clearfield	June 17, 1889	
3580	Foster, Theo. M.	Jan. 15, 1889	By examination	Marengo	North English	July 31, 1893	
3638	Franks, S. C.	April 2, 1889	By examination	Bentonsport	Farmington	Dec. 24, 1894	
3685	Frater, George W.	April 9, 1889	By examination	Thurman			In Nebraska.
3770	Fish, H. T.	Nov. 19, 1889	By examination	Columbus City	Mediapolis	Sept. 8, 1890	
3831	Fee, Frank	Feb 18, 1890	By examination.	Cumberland	Massena	June 2, 1893	
3880	Frizelle, C. H	April 18, 1890	By examination.	Viele	Rockford		Out of business.
3939	Fulton, Levi B.	Sept. 19, 1890	By examination.	Clarksville			In Wisconsin.
4035	Fitton, James T.	April 20, 1891	By examination.	Nevada	Paullina	Oct. 22, 1895	
4045	Forsyth, James C.	May 5, 1891	By examination.	What Cheer	Redfield	April 5, 1897	
4053	Farner, Rudolph	May 8, 1891	By examination.	Wilton Junction.			
4107	Fletcher, C. T.	Aug. 12, 1891	Graduate	Decorah	Thompson	Mar. 6, 1893	
4273	Fowler, L. E.	July 12, 1892	By examination.	Collins	Lynnville	Nov. 19, 1893	
4288	Fox, Harry C	Aug. 2, 1892	By examination.	McGregor	Monona	Nov. 29, 1892	
4325	Fesler, E. S	Aug. 1, 1892	By examination.	Riverside			Out of business.
4358	Forrester, J. S.	Dec. 27, 1892	By examination.	Newton	Indianola	July 31, 1893	
4389	Fickes, John F.	Feb. 28, 1893	By examination.	Des Moines	Panora.		
4458	Forsyth, David B.	May 25, 1893	By examination.	Mystic.			
4463	Fry, William Nelson	May 29, 1893	By examination.	Marcus.			
4508	Falkenhamer, A	Aug. 9, 1893	By examination.	Dubuque	Algona.	Nov. 18, 1895	
4509	Florine, Frank W.	Sept. 5, 1893	By examination.	Clinton			In Wisconsin.
4543	Ford, Jesse	Nov. 8, 1893	By examination.	What Cheer.			

4545	Flaherty, John F.	Nov. 14, 1893	By examination	Fort Dodge.			
4580	Faus, Charles A.	Feb. 6, 1894	By examination	Onawa	Clarinda	May 8, 1894	
4715	Freeman, F. E.	Sept. 4, 1894	By examination	Gilmore City	Jolley	Oct. 31, 1894	
4727	Foster, W. O.	Sept. 4, 1894	By examination	Newton			Out of business.
4806	Fellows, E. H	Jan. 29, 1895	By examination	Des Moines	Cambridge	Feb. 10, 1897	
4810	Frieberg, Emil L.	Feb. 5, 1895	By examination	Charles City	Northwood	Feb. 25, 1895	
4888	Franks, W. N	Feb. 7, 1896	By examination	Des Moines	Perry	Jan. 1, 1895	
5027	Fellows, W. B.	Mar. 28, 1896	Graduate	Des Moines.			
5034	Foster, H. E.	April 7, 1896	By examination	Toledo	Tama	Oct. 6, 1896	
5042	Freisinger, Joseph	April 7, 1896	By examination	Marion	Lansing	Feb. 18, 1897	
5058	Foster, O. G	April 14, 1896	By examination	Hamburg	Emerson	Dec. 30, 1896	
5063	Farran, J. S	April 21, 1896	By examination	Primghar.			
5090	Frahm, F. W.	June 2, 1896	By examination	Reinbeck.			
5142	Fish, G. H	Sept. 1, 1896	By examination	Anita.			
5182	Finn, G. W.	Jan. 5, 1897	By examination	Belmond.			
5183	Ferney, A. L.	Jan. 5, 1897	By examination	Des Moines.			
5208	Fleming, E. W.	Feb. 2, 1897	By examination	Manson.			
5215	Fried, A. F.	Mar. 2, 1897	By examination	Oakland.			
5216	Foley, C. L.	Mar. 2, 1897	By examination	Newell.			
136	Griffith, J. A.	June 14, 1880	As owner	What Cheer.			
301	Gibbons, A. D.	June 5, 1880	As owner	Bloomfield.			
506	Gotshall, George A.	June 3, 1880	As owner	Miles.			
533	Gwathmer, G. O.	June 24, 1880	As assistant	Glenwood.			
621	Gruwell, Charles B.	June 3, 1880	As owner	Grinnell.			
810	Garretson, B. F.	June 15, 1880	As owner	Osceola.			
848	Grigg, Robert C.	June 3, 1880	As owner	Murray.			
867	Geiss, Henry	June 5, 1880	As owner	Muscatine.			
883	Griffin, Francis	June 10, 1880	As owner	Mapleton.			
993	Gephart, Arthur	June 18, 1880	As owner	Ottumwa.			
1235	Guenther, J. H.	June 2, 1880	As assistant	Sabula.			
1266	Giles, Daniel R.	July 10, 1880	As owner	Union	Harris	April 1, 1897	
1303	Glasgow, L. G.	June 3, 1880	As assistant	Washington.			
1330	Gamble, Thos. D.	June 12, 1880	As owner	Wheatland.			
1463	Gandrup, W. D.	July 17, 1880	Graduate	Story City.			
1483	Garfield, L. K.	July 21, 1880	As owner	Algona.			
1555	Gilchrist, W. T.	July 27, 1880	As owner	Waukon.			
1574	Given, Oliver E.	July 31, 1880	As assistant	Stuart.			
1763	Gould, C. E.	June 5, 1880	As owner	Mechanicsville.			
1864	Golliday, A. M.	Sept. 13, 1880	By examination	Bedford.			
1928	George, J. M.	Nov. 26, 1880	By examination	Iowa Falls			In Wisconsin.
2016	Giddings, William	Jan. 27, 1881	By examination	Logan.			
2214	Gesell, C. L.	Sept. 29, 1881	By examination.	Sac City	Duncombe	April 23, 1896	
2226	Griffith, J. C	Aug. 26, 1881	By examination	Greenfield	Ellsworth	Mar. 2, 1895	
2361	Gardner, H. G.	Feb. 28, 1882	By examination	Denison	Buffalo Center	May 2, 1894	
2414	Godding, Carl	April 17, 1882	By examination	Boone	Madrid	Feb. 5, 1891	
2455	Gardner, J. B.	May 22, 1882	By examination	Denison	Manilla	Dec. 24, 1886	Out of business.
2459	Green, Fred E.	May 24, 1882	By examination	Oskaloosa.			
2679	Gardner, W. W	Aug. 21, 1883	By examination.	Avoca.			
2688	Graves, George B.	Sept. 18, 1883	By examination	Milton			In Missouri.

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
2724	**Gerber, Louis** N	Mar. 4, 1884	By examination	Williams	Webster City	April 4, 1894	
3049	Graham, C C	July 19, 1886	By examination	Baxter.			
3097	Guthrie, John M	Oct. 26, 1886	By examination	Tripoli			
3108	Gore, Irwin	Nov. 24, 1886	By examination	Pilot Mound.			
3121	Goss, Joseph S	Jan. 4, 1887	By examination	Harlan	Atlantic	Sept. 3, 1890	
3180	Graff, W. H	Feb. 28, 1887	By examination	Carson	Iowa City	Jan. 20, 1896	
3197	Gardner, A. J	April 5, 1887	By examination	Ogden.			
3202	Grimwood, E. A	May 10, 1887	By examination	Independence	Oxford Junction	Oct. 14, 1887	
3223	Goodall, Parr	April 20, 1887	By examination	Osage.			
3305	Georges, A. G	Sept. 3, 1887	Graduate	Marcus.			
3311	Gardner, H W	Sept. 6, 1887	By examination	New Hampton.			
3331	Garrity, M W	Oct. 12, 1887	By examination	Des Moines.			
3419	Gordiner, F. L	Mar. 20, 1888	By examination	Adair	Wiota	Mar. 28, 1891	
3449	Guiney, H. P	May 7, 1888	Graduate	Sioux City.			
3456	Geselchap, A F	May 15, 1888	By examination	Orange City.			
3470	Griswold, E B	June 5, 1888	By examination	Stuart	Earlham	Feb. 28, 1891	
3479	Grimm, William H.	June 19, 1888	By examination	Waukon	Traer	Oct. 23, 1888	
3505	Griffin, Charles J	Aug. 21, 1888	By examination	Cedar Falls	Montezuma	Feb. 9, 1895	
3609	Green, J. E	Feb. 19, 1889	By examination	Milford.			
3620	Goldthwait, F. O	Mar. 19, 1889	By examination	Marengo			Out of business.
3621	Gardner, George N	Mar. 19, 1889	By examination	Webster City.			
3664	Glasgow, James D	May 21, 1889	By examination	Washington.			
3695	Graham, Ed L	July 24, 1889	Graduate	Muscatine.			
3711	Goodwin, F. L. B	Aug. 20, 1889	By examination	Malvern.			
3760	Graham, Robert D	Oct. 29, 1889	By examination	Strawberry Point	Monona	Jan. 5, 1896	
3822	Gill, Bert A	Feb. 8, 1890	By examination	Springdale	West Branch	Sept. 7, 1892	
3828	Grant, Charles S	Feb. 8, 1890	By examination	Iowa City	Badger	Mar. 22, 1897	
3900	Green, Samuel W.	June 19, 1890	By examination	Janesville			I
3911	Graham, H. A	July 18, 1890	By examination	Eldon	Fairfield	Dec. 28, 1896	
3925	Gurney, C L	Sept. 2, 1890	By examination	Doon			In Dakota.
3954	Graff, J. E	Oct. 31, 1890	By examination	Carson	Colfax	Nov. 14, 1896	
4001	Glen, A. A	Mar. 3, 1891	By examination	Lohrville	Plover	Dec. 16, 1895	
4021	Gardner, George H	Mar. 17, 1891	Graduate	Des Moines	Perry	Oct. 19, 1891	
4072	Grimm, A. L	June 2, 1891	By examination	Traer	Rockford.		
4115	Gangestad, S. M	Sept. 1, 1891	By examination	Bode.			
4123	Gibson, R. M.	Oct. 6, 1891	By examination	Bloomfield	Ottumwa.		
4160	Galbraith, Samuel	Jan. 5, 1892	By examination	Hull	Rockford	Mar. 18, 1893	

4178	Gauss, Michael	Feb. 2, 1892	By examination	Shenandoah	Coin	Mar. 25, 1895	
4189	Graham, Will A.	April 26, 1892	By examination	Des Moines.			
4203	Gregg, Finley K.	Mar. 24, 1892	By examination	Iowa City	Badger	June 10, 1895	Out of business.
4274	Gressler, F. J	July 13, 1892	By examination	Adair	Chapin	June 23, 1894	
4285	Graves, Fred A.	Aug. 4, 1892	Graduate	Beacon.	Garden Grove	Jan. 1, 1897	
4302	Gose, K. E	Sept. 6, 1892	By examination	Pleasantville	Lorimer	Dec. 6, 1893	
4316	Groneman, F. C.	Oct. 4, 1892	By examination	Whittemore.			
4376	Graves, Edwin H.	Feb. 7, 1893	By examination	Ames	Gilbert Station	Feb. 12, 1894	
4391	Gibbeaut, H. E	Mar. 4, 1893	By examination.	Mechanicsville.			
4401	Gregory, Frank E.	Mar. 15, 1893	Graduate	Osage	Red Oak	Jan. 17, 1897	
4448	Gerboth, Edw. E.	May 2, 1893	By examination	Sioux City.			
4449	Gallagher, Joe	May 5, 1893	By examination	Sheldon	Akron	Nov. 6, 1894	
4477	Griffin, H. M.	June 20, 1893	By examination	Ft. Dodge.			
4478	Grimm, G. Adolph	June 20, 1893	By examination	Dubuque.			
4486	Guthrie, Fred L.	July 5, 1893	By examination	Tripoli.			
4513	Griffin, Charles F.	Mar. 8, 1893	By examination	Mapleton.			
4530	Gordinier, Isle	Mar. 24, 1893	By examination	Wiota	Cumberland	Mar. 19, 1895	
4631	Garrett, J. M	April 3, 1894	By examination	Troy			
4649	Gregg, Fred W	May 1, 1894	By examination	Cherokee	Janesville	Aug. 23, 1895	In Illinois.
4676	Gill, Vincent V.	June 5, 1894	By examination	Fairbank.			
4681	Grove, Raymond E.	Oct. 12, 1893	By examination.	Grand Junction.			
4704	Graves, Alva V.	Aug. 7, 1894	By examination	Hawarden	Riceville	Nov. 26, 1895	
4707	Gumore C. Adelbert	Aug. 9, 1894	By examination.	Ft. Madison	Centerville	Aug. 15, 1895	
4709	Gregory, F. W	Aug. 6, 1894	By examination	Geneva.			
4745	Gipple, L. U	Oct. 2, 1894	By examination	Letts.			
4761	Guernsey, J. J.	May 2, 1893	By examination	Bloomfield.			
4777	Garey, C E	Nov. 13, 1894	By examination	Marshalltown.			
4799	Graves, F. H.	Jan. 15, 1895	By examination	Madrid.			
4833	Green, Schuyler E	Mar. 5, 1895	By examination.	Anamosa	Osage	Feb. 22, 1897	
4868	Gibbons, A S	April 2, 1895	By examination	Manchester	Ryan	Mar. 2, 1896	
4875	Goodwin, Clarence G.	May 7, 1895	By examination	Luverne.			
4920	Graham, J W	Aug. 9, 1895	By examination	Early.			
4931	Gregerson, James	Sept. 17, 1895	By examination.	Harlan.			
4942	Gerard, S A	Oct. 6, 1895	By examination	Gladbrook.			
4980	Glynn, T H	Jan. 7, 1896	By examination	Cascade.			
4982	Getman, N. E.	Jan. 7, 1896	By examination	Larchwood.			
4995	Grady, M J	Feb. 4, 1896	By examination	Hawarden.			
5030	Graff, George L.	April 7, 1896	By examination	Bedford			
5051	Grems, B W	April 7, 1896	By examination	Fredricksburg	Ryan	Dec. 10, 1896	
5055	Glasgow, J M.	April 17, 1896	By examination	Waterloo	Plainfield	May 9, 1896	
5058	Graves, F W	April 7, 1896	By examination	Ocheyedan.			
5083	Goodenow, N. H.	May 5, 1896	By examination	Goodell.			
5091	Gitchell, J. H.	June 2, 1896	By examination	Walker.			
5133	Gwinn, E. H	Sept. 1, 1896	By examination	Victor.			
5195	Ginther, J. S.	Feb. 2, 1897	By examination	Manning	Scranton	May 19, 1897	
5198	Gray, H. E	Feb. 2, 1897	By examination	Kensett	Northwood	Feb. 19, 1897	
5236	Griffin, D J	April 6, 1897	By examination	Clare.			
5279	Greiner, L. F.	June 1, 1897	By examination	Blairsburg.			
5284	Grigg, M. F	June 7, 1897	Graduate	Murray.			

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
12	Husband, C. A	June 4, 1880	As owner	Waucoma.			
57	Himrod, Mrs D M	June 8, 1880	As owner	What Cheer.			
61	Harwood, George	June 7, 1880	As owner	Masonville	Epworth	Aug. 25, 1894	
90	Hyde, M. J.	June 10, 1880	As owner	Brandon.			
203	Hinchman, A. C.	June 12, 1880	As owner	Red Oak.			
307	Hunter, W. A.	June 14, 1880	As assistant	Belle Plaine	Des Moines.		
308	Hill, T. W.	June 4, 1880	As principal	Batavia.			
325	Hatton, James W.	June 21, 1880	As owner	Carroll.			
349	Harle, H. D	June 8, 1880	As owner	Council Bluffs.			
352	Huston, George W	June 4, 1880	As owner	Clinton.			
422	Hervey, James	June 4, 1880	As owner	Dubuque.			
431	Hippee, Warren	June 12, 1880	As owner	Des Moines.			
470	Harrison, C. E.	June 4, 1880	As assistant	Davenport.			
479	Haas, Julius W	June 3, 1880	As owner	Dubuque.			
548	Hagensick, H. H.	June 17, 1880	As owner	Elkader.			
564	Hammond, J. H.	June 7, 1880	As owner	Eldora.			
567	Henry, William G	June 4, 1880	As owner	Emmetsburg.			
586	Higley, Daniel G	June 23, 1880	As owner	Fairfield.			
661	Hovey, H. W.	June 24, 1880	As assistant	Independence.			
774	Hope, George T.	June 4, 1880	As owner	Little Sioux	Sioux City	Nov. 4, 1890	
775	Hope, William H	June 5, 1880	As owner	Little Sioux.			
795	Haman, George C	June 29, 1880	As owner	Cedar Rapids.			
888	Hatter, John V.	June 11, 1880	As owner	Millersburg.			
911	Horne, John.	June 2, 1880	As owner	Mt. Ayr.			
1071	Howenstein, W. M	June 5, 1880	As owner	Parkersburg.			
1180	Huegle, H. W	July 10, 1880	As assistant	Des Moines.			
1185	Hansen, F.	June 7, 1880	As owner	Sioux City.			
1196	Hopper, B. M.	June 14, 1880	As owner	Springville.			
1197	Hopper, Mary S.	June 14, 1880	As owner	Springville.			
1280	Hopwood, A. L	July 9, 1880	As owner	Vinton.			
1319	Hanna, John W.	June 28, 1880	As owner	Winfield.			
1426	Helfritz, R.	July 14, 1880	As owner	St. Ansgar			Out of business.
1478	Houghton, F. E	July 20, 1880	As assistant	Adel.			
1510	Halstead, T. J	July 23, 1880	As assistant	Savannah.			
1518	Hansen, H. C.	July 26, 1880	As assistant	Des Moines.			
1539	Henry, George C	July 28, 1880	As assistant	Burlington.			
1686	Haskell, George E	Aug. 4, 1880	By examination	Oelwein	Decorah	Mar. 22, 1888	Left the state.

1687	Harlan, Charles E	Aug. 3, 1880	By examination	Des Moines.			
1689	Hammer, Alfred	Aug. 10, 1880	By examination	Des Moines.			
1695	Harlan, L. L	July 31, 1880	By examination.	Ottumwa	Hawarden	May 22, 1885	
1728	Harris, T C	Sept. 9, 1880	As owner	Bartlett.			
1734	Heiser, Rudolph	Sept 14, 1880	As owner	Keokuk.			
1731	Herriott, John	Sept. 17, 1880	As owner	Stuart.			
1773	Hubbard, L. W	Oct. 10, 1880	As owner	Monmouth.			
1785	Hinshaw, John	Sept. 4, 1880	By examination.	Winterset.			
1803	Hays, David D	Aug. 24, 1880	By examination.	Cambridge	Riverton	Nov. 11, 1893	Out of business.
1830	Hinkle, George W	Oct. 25, 1880	As owner	Harvard.			
2008	Hall, Solon G	Dec. 21, 1880	By examination.	West Side	Alta	June 13, 1883	Out of business.
2058	Hyzer, William W	Feb. 26, 1881	By examination.	Casey	Guthrie Center	Feb. 20, 1888	Out of business.
2066	Hume, James H	Feb. 28, 1881	By examination.	Scranton	Brunswick, Mo	Jan. 27, 1892	
2087	Harrison, D. C	Mar. 30, 1881	By examination.	Clarksville.			
2153	Houston, O. J	May 21, 1881	By examination.	Audubon	Des Moines	April 10, 1891	Out of business.
2201	Henderson, H. C	July 15, 1881	By examination.	Cherokee	Sioux City.		
2306	Horton, Frank A	Aug. 24, 1881	By examination.	Gilman	Rock Rapids	Mar. 24, 1887	
2342	Hammer, A. G	Nov. 11, 1881	Graduate	Des Moines.			
2368	Hawyer, B. H	Nov. 10, 1881	By examination.	Audubon	Dedham	Mar. 22, 1888	Out of business.
2342	Hine, Charles W	Feb. 25, 1882	By examination.	Stanton.			
2417	Huston, J. T	April 21, 1882	By examination.	Clinton	Clinton	April 4, 1888	
2422	Harmon, J. A	April 29, 1882	By examination.	Irwin			Out of business.
2424	Hinton, G. A	May 5, 1882	By examination.	Frederick	Oskaloosa	Mar. 19, 1897	
2461	Hite, Robert B	May 26, 1882	By examination.	Clarinda.			
2484	Handle, Daniel	June 22, 1882	By examination.	Onawa.			
2496	Hoag, Ed H	July 3, 1882	By examination.	Strawberry Point.			Left the state.
2540	Henderson, J S	Oct 17, 1882	By examinat'on.	Rose Hill	Muchakinock	July 5, 1884	
2549	Hostetter, J. I.	Dec. 1, 1882	By examination.	Colo			Out of business.
2560	Holbrook, G. A	Feb. 10, 1883	By examination.	Dyersville	Webster City	April 9, 1897	
2562	Hansen, J. B.	Feb. 5, 1883	By examination.	Collins			Out of business.
2585	Henderson, W. L	Mar. 6, 1883	By examination.	West Branch	Clarinda	Oct. 14, 1884	
2603	Higdon, O. B.	April 17, 1883	By examination.	Allerton	Ottumwa	Mar. 16, 1887	
2643	Hanes, George W	June 5, 1883	By examination.	Maynard.			
2655	Hayes, J. W.	July 3, 1883	By examination.	Des Moines	Cedar Rapids	May 9, 1885	
2665	Howey, Frank.	July 27, 1883	By eqamination.	Fort Dodge.			
2704	Holtzschuherr, O.	Nov. 28, 1883	By examination.	Creston	Ottumwa.		
2709	Hadden, D. E.	Dec. 18, 1883	By examination.	Le Mars	Alta	April 7, 1887	
2715	Howe, A. J	Jan. 20, 1884	By examination.	Greenfield	Glenwood	Oct. 9, 1885	
2444	Hugg, A. A	May 6, 1884	By examination	Oskaloosa			Out of business.
2782	Hampton, R. B	July 15, 1884	By examination.	West Liberty	West Liberty	Nov. 29, 1889	
2789	Howard, George B	July 26, 1884	By examination.	Runnells	Neola	Sept. 22, 1892	
2804	Hoag, E. L	Sept. 3, 1884	By examination.	Tama City	Clinton	Feb. 24, 1886	Out of business.
2837	Highley, W. H	Feb. 7, 1885	By examination.	Storm Lake			Whitewood, S. D.
2863	Hyde, W. P	July 6, 1885	By examination.	Le Claire.			
2904	Hummell, M.	June 19, 1885	By examination.	Grundy Center.			
2910	Hamilton, B. G	Aug. 4, 1886	By examination.	Ocheyedan	(Ocheyedan only.)		
2936	Hill, F. M	Oct. 19, 1885	By examination.	Persia.			
2961	Howard. F	Feb. 2, 1886	By examination.	Sheldon.			
3031	Hampson, James C	June 15, 1886	By examination	Fairfield			In Denver.
3061	Houston, O. W	Aug. 3, 1886	By examination	Audubon	Exira	Feb. 8, 1890	

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
3069	Hall, Lincoln	Oct. 19, 1886	By examination	Lake City	Burt	Dec. 6, 1892	
3110	Havercamp, J. J	Dec. 21, 1886	By examination	Muscatine.			
3136	Hubbard, H. O	Feb. 1, 1887	By examination	Humboldt.			
3141	Hair, D. D.	Feb. 23, 1887	By examination	Belmond.			
3165	Huston, J. E	Feb. 25, 1887	By examination	Winfield.			
3173	Howard, C. R	Mar. 15, 1887	By examination	Anamosa.			
3190	Heine, W. H	Mar. 16, 1887	By examination	Guttenberg.			
3200	Hummer, James S	May 10, 1887	By examination	Fort Dodge.			
3213	Hadsel, H. S	April 5, 1887	By examination	Maynard			Out of business.
3220	Hibner, George M	April 19, 1887	By examination	Iowa Falls	Marion	April 12, 1888	
3245	Hine, J. B	May 17, 1887	By examination	Hampton	Fort Dodge	Mar. 3, 1897	
3267	Hamill, John R	June 21, 1887	By examination	Newell	Chicago.		
3273	Houghton, F. W	July 5, 1887	By examination	Council Bluffs.			
3313	Haas, Fred	Sept. 6, 1887	By examination	Marengo.			
3338	Henry, Arthur B	Oct. 20, 1887	By examination	Creston	Waverly	Mar. 10, 1896	
3340	Hassels, J. C	Oct. 26, 1887	By examination	Storm Lake	Primghar	Mar. 22, 1894	
3347	Hulett, Arthur	Nov. 15, 1887	By examination	Bloomfield	Red Oak	Mar. 15, 1890	
3352	Haefner, E. C	Dec. 17, 1887	By examination	Sioux City.			
3357	Hedges, Thomas M	Dec. 20, 1887	By examination	Grinnell.			
3374	Hardy, Rufus L	Feb. 7, 1888	By examination	Bloomfield	Winterset	Mar. 18, 1896	
3384	Hagensick, A. E	Feb. 15, 1888	By examination	Elkader			In Nebraska.
3420	Husted, D. W	Mar. 20, 1888	By examination	Indianola.			
3421	Henderson, E. L	Mar. 20, 1888	By examination	West Liberty.			
3431	Horner, T. E	April 8, 1888	By examination	Boone	Leon	Sept. 11, 1888	
3460	Huff, T. C	May 15, 1888	By examination	Missouri Valley.			
3464	Higgins, J. W	May 31, 1888	By examination	Auburn	Laurens	June 17, 1890	Out of business.
3498	Hammler, E. C	Aug. 7, 1888	By examination	Burlington.			
3529	Hinsley, J. J	Sept. 7, 1888	By examination	Avoca.			
3615	Hoffman, Charles F	Mar. 6, 1889	By examination	Orange City	Hull	July 19, 1896	
3617	Hunter, James E	Mar. 6, 1889	By examination	Allison	Remsen	May 21, 1892	Out of business.
3622	Handel, George W	Mar. 19, 1889	By examination	Webster City			In Montana.
3640	Howland, G. W	April 10, 1889	By examination	Rockwell.			
3659	Hunter, J. P	May 21, 1889	By examination	Hubbard	Arthur	July 27, 1898	
3674	Horsman, U. O	June 10, 1889	By examination	Storm Lake	Storm Lake	May 21, 1891	
3677	Henderson, J. L	June 15, 1889	By examination	Waterloo.			
3679	Harriman, O. B	June 18, 1889	By examination	Hampton.			
3692	Hofer, A. E	July 16, 1889	By examination	Solon	(Solon only).		

3706	Hall, L. G	Aug. 16, 1889	By examination	Coggon.			
3712	Harrison, J. C	Aug. 20, 1889	By examination	Burlington	Pacific Junction	April 7, 1891	
3713	Hutter, Vincent	Aug. 20, 1889	By examination	Fredericksburg	New Albin	Mar. 3, 1892	
3718	Holmes, W. L	Sept. 3, 1889	By examination	Keota.			
3756	Hunt, Homer	Oct. 16, 1889	By examination	Clinton	Comanche	May 17, 1890	
3774	Hufford, W. S	Dec. 3, 1889	By examination	Tama	Des Moines	April 9, 1890	
3786	Haslach, John A	Dec. 16, 1889	By examination	Ottumwa	Leando	April 30, 1897	
3806	Hendrix, N. T	Jan. 25, 1890	By examination	Letts	Columbus Junction	Oct. 29, 1890	
3807	Herley, George F	Jan. 24, 1890	By examination	Rockwell	Emmetsburg	Oct. 6, 1890	
3828	Harrington, J. D	Oct. 2, 1889	By examination	Wyoming	Grand Mound	Jan. 9, 1894	
3845	Hill, Olin E	Mar. 11, 1890	By examination	Clinton.			
3851	Henak, Miss Lillian	Mar. 18, 1890	By examination	Oxford Junction.			
3852	Huff, Frank B.	Mar 18, 1890	By examination	Missouri Valley	Little Sioux		Out of business.
3853	Hagan, James H	Mar. 18, 1890	By examination	Des Moines			In Chicago.
3871	Hews, R. H	April 8, 1890	By examination	Rockwell City.			
3876	Hunter, Fred	April 15, 1890	By examination	Mt. Ayr	Bellevue	Oct. 31, 1893	
3879	Hilsabeck, E. F	April 17, 1890	By examination	Manning.			
3886	Henderson, C. B	April 28, 1890	By examination	Waterloo.			
3899	Hedges, Miss Flo	June 10, 1890	By examination	Grinnell.			
3943	Herbert Frank	Oct. 7, 1890	By examination	Bridgewater.			
3975	Haire, Will W	Jan. 13, 1891	By examination	Fort Dodge.			
3977	Harris, W. W	Jan. 22, 1891	By examination	Minburn	Lake Park	Aug. 21, 1891	
4006	Hoff. J. A	Mar. 7, 1891	By examination	Doon.			
4009	Hochstettler, B F	Mar. 7, 1891	By examination	Maxwell	Kalona	Mar. 10, 1893	
4013	Homann, Richard	Mar. 7, 1891	By examination	Des Moines.			
4016	Hunt, A. V	Mar 18, 1891	By examination	New Market			Out of business.
4026	Hunnold, F. J	April 7, 1891	By examination.	Leon.			
4034	Henderson, James M	April 16, 1891	Graduate	Washington	Shenandoah	Mar. 7, 1896	
4041	Harrison, J H	April 23, 1891	Graduate	Davenport.			
4054	Heal, Frank	May 8, 1891	Graduate	Wesley.			
4060	Haas, Daniel J	May 26, 1891	Graduate	Dubuque.			
4066	Happman, John	June 2, 1891	Graduate	Burlington.			
4080	Hummell, Charles O	June 16. 1891	Graduate	Grundy Center			
4085	Hoffman, G. W	June 30. 1891	Graduate	Lamont.			
4111	Horner, Miss K. Z.	Aug. 29, 1891	By examination	Onawa			Out of business.
4129	Hingtgen, Nich J	Oct. 28, 1891	By examination	Bellevue	La Motte	Jan. 21, 1892	
4134	Hindorf, A. E	Nov. 5, 1891	By examination	Dexter	Newton	May 14, 1892	
4142	Henry, W. P	Nov. 17, 1891	By examination	Nora Springs	Des Moines	Feb. 12, 1893	
4143	Harr, John L	Nov. 17, 1891	By examination	Belmond	Klemme	Nov. 30, 1892	
4150	Hufford, Ed. H	Dec. 1, 1891	By examination	Fairfield.			
4157	Hibbs, G. H	Dec. 19, 1891	By examination	Mitchellville			Out of business.
4167	Hameker, G. E	Jan. 29. 1892	By examination	Jewell Junction.	Stanhope	Feb. 26, 1897	
4179	Hoyle, Isaac W	Feb. 12, 1892	By examination	Mt. Vernon.			
4195	Harlan, Oren O.	Mar. 3, 1892	By examination	Storm Lake.			
4201	Heming, William J	Mar. 24, 1892	By examination	Clinton.			
4211	Hackett, C W	April 5, 1892	By examination	Des Moines	Marathon	June 31, 1892	
4223	Haynes, Charles E	Mar. 8, 1892	By examination	Oskaloosa	Mason City	Mar. 5, 1895	
4226	Henderson, H. J	May 3, 1892	By examination	Williamsburg			Out of business.
4234	Hughes, Ralph E.	May 10, 1892	By examination	Laurens		Sept. 5, 1894	
4246	Hamill, Mrs. E. B	June 7, 1892	By examination	Stanhope.			

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
4254	Hughes, Thomas	June 24, 1892	By examination	Victor	Hartley	Mar. 31, 1894	
4258	Hilsabeck, T. M.	July 1, 1892	By examination	Manilla	Red Oak.		
4266	Hazlett, John C.	July 5, 1892	By examination	Muscatine.	Atalissa	Aug. 8, 1896	
4273	Hood, E. J.	July 12, 1892	By examination	Clare.			
4284	Henry, John W.	Aug. 4, 1892	Graduate	Greeley	Strawberry Point	Nov. 19, 1895	
4286	Hamler, W. A.	Aug. 2, 1892	By examination	Atlantic	Exira	Mar. 19, 1896	
4287	Holihan, J. H.	Aug. 3, 1892	By examination	Rockwell	Hospers	Sept. 25, 1893	
4294	Harrison, J. W.	Aug. 25, 1892	By examination	Anita	Guthrie Center	April 13, 1897	
4298	Holland, John E.	Sept. 6, 1892	By examination	Mt Pleasant			
4310	Hunter, J. W.	Sept. 6, 1892	By examination	Council Bluffs	Farmington	Aug. 3, 1893	
4317	Harrison, Fred W.	Oct. 4, 1892	By examination	Humeston	.....	.....	In Illinois.
4326	Hoagland, F. T.	Nov. 1, 1892	By examination	Nora Springs	Jesup	June 25, 1897	
4350	Higbee, U. B.	Dec. 20, 1892	By examination	Ruthven	Lake Park	Jan. 18, 1895	
4355	Hutchison, J. A.	Jan. 3, 1893	By examination	Truro.			
4359	Holmes, George B.	Jan. 10, 1893	By examination	Marshalltown	Cedar Rapids	May 8, 1893	
4380	Henderson, C. R.	Feb. 8, 1893	By examination	West Liberty.			
4393	Hermanson, T. P.	Mar. 7, 1893	By examination	Goldfield	Roland	Mar. 10, 1894	
4412	Hoon, Grant	Mar. 7, 1893	By examination	Tipton.			
4419	Hanson, A. W.	Mar. 18, 1893	Graduate	Lake Mills	.....	Feb. 12, 1895	
4424	Hufford, G. E.	Mar. 28, 1893	By examination	Des Moines.			
4430	Hursh, Will T.	April 4, 1893	By examination	Des Moines.			
4469	Hurlbut, J. R.	June 6, 1893	By examination	Des Moines.			
4480	Harrod, H. D.	June 29, 1893	By examination	Montezuma	Des Moines	Jan. 16, 1894	
4484	Hamilton, L C.	July 5, 1893	By examination	Clarion.			
4503	Hedley, John E.	Aug. 9, 1893	By examination	Dubuque.			
4555	Hammer, C. H.	Dec. 5, 1893	By examination	Hawarden	.....	.....	South Dakota.
4573	Held, William	Feb. 6, 1894	By examination	Burlington	Cedar Falls	Dec. 15, 1894	
4576	Hieber, Louis O.	Feb. 6, 1894	By examination	Traer.			
4584	Hart, W. E.	Feb. 6, 1894	By examination	Sioux City	West Side	Sept. 11, 1895	
4614	Haggarth, W. W.	Mar. 6, 1894	By examination	Ruthven	Manson	Nov. 1, 1895	
4618	Hills, F. N.	April 3, 1894	By examination	Clarion.			
4633	Holt Edward S.	April 17, 1894	.....	Anamosa.			
4650	Hildesheim, Jacob J.	May 1, 1894	By examination	Alton	Maurice	Dec. 12, 1896	
4654	Holmes, Eva R.	May 1, 1894	By examination	Chancey	Clinton	Feb. 22, 1895	
4657	Halbert, M. M.	June 5, 1894	By examination	Elliott	Imogene	Aug. 18, 1894	
4691	Hughes, Edward J.	July 3, 1894	By examination	Mystic	Mt. Pleasant	Dec. 30, 1896	
4730	Henderson, Harry H.	Sept. 4, 1894	By examination	Waterloo.			

4729	Harriman, J. E.	Sept. 4, 1894	By examination	Hampton.			
4735	Henderson, W. H.	Sept. 4, 1894	By examination	Baldwin.			
4744	Hamilton, Ralph C.	Oct. 2, 1894	By examination	Keota.			
4746	Haesler, Henry F.	Oct. 2, 1894	By examination	Lisbon.			
4763	Hoy, Andrew W	Oct. 2, 1894	By examination	Cedar Falls.			
4787	Haffner, F. F.	Dec 4, 1894	By examination	Sigourney.			
4790	Hill, F. S.	Dec. 18, 1894	By examination	Oelwein	Des Moines	Nov. 5, 1895	
4807	Harris, Lewis C.	May 16, 1893	By examination	Des Moines	Thurman	Dec. 29, 1893	
4808	Henery, Wilbur J.	Dec. 23, 1895	By examination	Winterset.			
4831	Helgesan, P. A	Mar. 5, 1895	By examination	Lake Mills.			
4848	Hanske, Ed. A	Mar. 26, 1895	By examination	Bellevue.			
4849	Hintz, Louis W.	Mar 26, 1895	By examination	Boone.			
4854	Hall, A. P.	Mar. 28, 1894	By examination	Blockton.			
4878	House, J. G	May 7, 1894	By examination	Afton.			
4896	Hack, Leon D.	June 18, 1895	By examination	Humboldt.			
4900	Heiberger, Matthew G.	July 2, 1895	By examination	Ackley.	Grundy Center	July 9, 1896	
4909	Holtzinger, P. S.	July 16, 1895	By examination	Hamburg	Emerson	Mar. 6, 1896	
4938	Henpel, F. C.	Sept. 17, 1895	By examination	Clinton	Buffalo	Feb. 6, 1897	
4948	Hansen, Geo	Dec. 3, 1895	By examination	Council Bluffs.			
4955	Hopkins, C. M.	Dec. 3, 1895	By examination	Wall Lake.			
4961	Heath, Lawrence	Dec 17, 1895	By examination	Massena	Atlantic	Jan. 15, 1896	
4969	Harrod, I. E.	Jan. 3, 1896	Graduate	Des Moines.			
4973	Holden, J. P.	Jan. 7, 1896	By examination	Delta.			
4974	Heiden, L. F.	Jan. 7, 1896	By examination	Watkins	Garrison	April 28, 1896	
4989	Harvey, R. W.	Feb. 4, 1896	By examination	Logan.			
4991	Hully, H. D	Feb. 4, 1896	By examination	Elliott.			
4994	Hesse, R. C.	Feb. 4. 1896	By examination	Logan.			
4996	Harlan, Will D	Feb. 4, 1896	By examination	Macedonia,			
5004	Hallowell, J. E.	Feb. 25, 1896	By examination	Swan.			
5017	Horton, F. E.	Mar. 3, 1896	By examination	Struble.			
5038	Hibner, Chas., Jr.	April 7, 1896	By examination	Iowa Falls	Gilmore City	Sept. 29, 1896	
5052	Haag, A. M	April 16, 1896	Graduate	Bevington	Stuart	Aug. 20, 1896	
5068	Hageboeck, W. J.	May 5, 1896	By examination	Lyons.			
5069	Hirschfieldt, Frank	May 5, 1896	By examination	Tipton.			
5098	Hannum, W. J.	June 2, 1896	By examination	Early.			
5104	Hamilton, Wm	July 7, 1896	By examination	Boone.			
5124	Hunter, E. G	Aug. 4. 1896	By examination	Eldora.			
5129	Hintzen, H. F.	Jan. 1, 1896	By examination	Mason City	Plymouth	May 3, 1897	
5130	Harstad, Oliver	Aug. 4, 1896	By examination	Sioux City.			
5139	Horton, C. D.	Sept. 1, 1896	By examination	Ft Atkinson.			
5150	Hatelstad, M. L.	Oct. 6, 1896	By examination	Radcliffe.			
5151	Hummel, J. F.	Oct. 6, 1896	By examination	Grundy Center.			
5152	Hedges, Grace L.	Oct. 6, 1896	By examination	Grinnell.			
5159	Hill, J. G.	Nov. 4, 1896	Graduate	Des Moines.			
5206	Harper, J. A., Jr.	Feb. 2, 1897	By examination	Greenfield.			
5213	Hartman, C. P.	Mar. 2. 1897	By examination	Clinton.			
5214	Henry, A. L.	Mar. 2, 1897	By examination	Strawberry Point.			
5227	Highley, L. E.	Mar. 9, 1897	By examination	Storm Lake			Whitewood, S. D.
5235	Harris, H. H.	April 6, 1897	By examination	Carson	Corning	July 2, 1897	
5264	Hastings, W. C.	May 4, 1897	By examination	Ruthven.			

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
1576	Ingalls, Joseph E	Aug. 22, 1880	As owner	Denmark.			
1603	Irwin, Charles E	Aug. 3, 1880	By examination	Elliott	Henderson	April 4, 1886	
2208	Ingersoll, R. B	April 17, 1882	By examination	Boone.			
2878	Isbell, G. A	May 12, 1885	By examination	Maquoketa.			
3559	Ingvoldstad, C. O	Nov. 20, 1888	By examination	Sergeant's Bluffs	Milford	Jan. 27, 1897	
3598	Ingleson, Fritz E	Feb. 14, 1889	By examination	Des Moines	Goldfield	Mar. 29, 1897	
3988	Israel, Miss Mary	Feb. 7, 1891	By examination	(Brighton only).			
3993	Irwin, William T	Feb. 17, 1891	By examination	Des Moines	Valley Junction	Mar. 5, 1894	
4324	Isbell, Arthur	Nov. 1, 1893	By examination	Cresco	Calmar	Mar. 20, 1895	
4326	Irwin, Henry	Nov. 1, 1892	By examination	Angus	Rippey	—— —, 1895	
4559	Ingersoll, J. B	Dec. 12, 1893	By examination	Boone.			
4772	Ingledue, E. C	Nov. 8, 1894	By examination	Zearing.			
236	Johnson, S M	June 19, 1880	As owner	Carson.			
237	Johnson, Ella S	June 19, 1880	As assistant	Carson.			
355	Johnson, Henry	June 3, 1880	As owner	Cedar Falls.			
497	Janes, Edward L	June 12, 1880	As assistant	Des Moines.			
620	Johnson, Joseph G	June 3, 1880	As owner	Grinnell.			
746	James, Isaac	June 3, 1880	As owner	La Porte City.			
789	Johnston, R. H	July 1, 1880	As owner	Cromwell.			
1013	Jamison, George W	June 3, 1880	As owner	Oelwein.			
1088	Junger, Hugo	June 5, 1880	As assistant	Reinbeck.			
1607	Jordan, F. H	Aug. 27, 1880	As owner	Danville			Burlington, Ia.
1836	Jones, J. R.	Nov. 19, 1880	As owner	Fertile.			
1853	Johnson, L. M	Sept. 20, 1880	By examination	Winthrop	Storm Lake	June 21, 1882	
1863	Jones, J. B.	Oct. 13, 1880	By examination	Denison	Atlantic	April 16, 1885	Out of business.
1897	Jones, G. W	July 31, 1880	By examination	Peoria City	Valeria	Mar. 22, 1892	
2042	Joder, Josiah K	April 15, 1881	As assistant	Waterloo.			
2073	Jennings, Joseph, Jr	April 7, 1881	By examination	Wilton Junction			Hampton.
2289	Johnson, Barnett	Dec. 6, 1881	By examination	La Moille	Ida Grove	April 9, 1894	
2372	Jones, Thomas B	Mar 25, 1882	By examination	Floris	Melbourne	June 20, 1894	
2397	Jones, S. O.	April 17, 1882	By examination	Humboldt	Pocahontas	Nov. 26, 1895	
2468	Jones, Uriah C	June 5, 1882	By examination	Breda.			
2728	John, Milo J	Feb. 18, 1884	By examination	Clinton.			
2800	Jenkins, Hugh	Sept. 2, 1884	By examination	Preston.			
3046	Jay, George H	Sept. 10, 1886	Graduate	Shenandoah.			
3077	Jackson, J. W	Sept. 21, 1886	By examination	Des Moines			In Quitman, Mo.

3176	Johnson, Alfred	Mar. 17, 1887	By examination	Given.			
3299	Jericho, John H.	Aug. 16, 1887	By examination	Mt. Pleasant.			
3345	Jurgensen, P. H.	Nov. 17, 1887	By examination	Clinton	Lowden	Jan. 15, 1890	
3358	Johnson, John A.	Dec. 21, 1887	By examination.	Des Moines.			
3367	Jordan, H. M.	Jan. 17, 1888	By examination.	Dunville	Burlington	Nov. 29, 1889	
3551	Joselyn, E. S.	Nov. 1, 1888	By examination	Stratford	Bancroft	June 22, 1897	
3562	Johnson, Aaron	Nov. 1, 1888	By examination	Des Moines			Out of business.
3586	Jackson, Frank O.	Jan. 30, 1889	By examination	Cedar Falls.			
3644	Judisch, George	April 16, 1889	By examination	Muscatine	Ames	July 21, 1894	
3655	Jones, E. S.	May 10, 1889	By examination	Chariton.			
3795	Johnson, Charles J.	Jan. 7, 1890	By examination	Clarinda.			
3799	John, G. W.	Jan. 15, 1890	By examination	Lucas.			
3829	Jones, Paul W.	Feb. 18, 1890	By examination	Roland	Laurens	Nov. 16, 1893	
3861	Jackson, G. H.	Mar. 20, 1890	By examination	Cresco.			
3864	Jones, Roland	Mar. 31, 1890	By examination.	Le Mars	Lester	May 25, 1897	
3931	Johnson, E. L.	Sept. 2, 1890	By examination	Stanhope	Des Moines	Nov. 24, 1896	
3932	Joder, A. T.	Sept. 4, 1890	By examination	Waterloo	Hudson	Sept. 2, 1896	
4017	Jaun, Albert H.	Mar. 18, 1891	By examination	Des Moines.			
4023	Jones, L. H.	Mar. 7, 1891	By examination	Shelby	Shelby	Sept. 1, 1891	
4077	Johnson, F. W.	June 9, 1891	By examination	Des Moines	Prairie City	May 12, 1892	
4106	Johnson, H. B.	Aug. 24, 1891	By examination	Ottumwa.			
4113	Jesson, Balzer T.	Sept. 1, 1891	By examination	Irwin	Manilla.		
4165	Jones, Samuel A.	Jan. 28, 1892	By examination	Cumberland.			
4197	Jones, Harry F.	Mar. 3, 1892	By examination	Corning		June 18, 1894	
4199	Johnson, Anton C.	Mar. 7, 1892	Graduate	Ottumwa	Des Moines	June 25, 1892	
4232	Johnson, Harry A.	May 19, 1892	Graduate	Sioux Rapids.			
4323	Jones, W.	Oct. 11, 1892	By examination	Lima	Wadina	Nov. 10, 1892	
4337	Jessup, A. E.	Dec. 6, 1892	By examination	Des Moines	Caledonia	April 17, 1894	
4364	Julius, E. D.	Jan. 24, 1893	By examination	Manson		——— —, 1895	
4378	Johnson, Dee W.	Feb. 7, 1893	By examination	Clarinda	Clearfield	June 27, 1893	
4441	Jensen, Hans	May 2, 1893	By examination	Jewell Junction	Des Moines	June 1, 1895	
4547	Johnson, J. N.	Nov. 23, 1893	By examination	Sigourney.			
4590	Jones, J. D.	Jan. 26, 1893	By examination	Carbon	Logan	Oct. 30, 1896	
4606	Janss, Henry	Mar. 15, 1894	Graduate	Marshalltown.			
4655	Johnson, Franklin	May 1, 1894	By examination.	Des Moines	Superior	Oct. 8, 1894	
4685	Junkerman, Julius	June 26, 1894	By examination	Ackley.			
4751	Jackson, M. M.	Oct. 2, 1894	By examination	Carbon.			
4754	Johnson, William F.	Oct. 2, 1894	By examination	Callender	Manson	May 26, 1896	
4822	Jester, Lulu B.	Feb. 9, 1895	By examination	Muscatine	Iowa City	Mar. 14, 1896	
4835	Jones, A. F.	Mar. 5, 1895	By examination	Mechanicsville	Cedar Rapids	Dec. 16, 1896	
4922	Jackson, T. C.	Aug. 6, 1895	By examination	Keosauqua.			
4953	Jeffrey, Frank D.	Dec. 3, 1895	By examination	Clarinda.			
5118	Johnson, T. W.	Aug. 4, 1896	By examination	Cedar Rapids.			
5123	Jones, C. H.	Aug. 4, 1896	By examination.	Le Mars.			
5144	Johnson, E. R.	Sept. 1, 1896	By examination	Lenox	Monroe	Feb. 18, 1897	
5161	Johannsen, Otto	Nov. 6, 1896	Graduate	Davenport.			
2333	Keys, J. N.	Mar. 30, 1882	By examination	Nugent's Grove	Walker	Sept. 14, 1895	
2418	Kane, Philip	April 26, 1882	By examination	Oelwein			Out of business.
2515	Knapp, James J.	Aug. 18, 1882	By examination	Dubuque	Waterloo	Feb. 15, 1883	

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
2595	Keeler, Charles E.	Mar. 21, 1883	By examination	Lake Mills.			
2637	Kimmell, B. G.	May 31, 1883	By examination	Winfield	Monmouth, Ill.	Jan. 23, 1891	
2822	Kinney, O. S.	Dec. 20, 1884	By examination	Council Bluffs	...	...	In Nebraska.
2823	Knecht, Allen	Sept. 26, 1884	By examination	Van Horne	Modale	Mar. 24, 1894	
2868	Kilchmann, J. T.	April 27, 1885	By examination	Des Moines	Muscatine	Jan. 24, 1887	
2888	Kenyon, W. C.	June 2, 1885	By examination	Mt. Union	Burlington	Aug. 15, 1888	
2987	Kneist, Frank V.	Mar. 2, 1886	By examination	Carroll	Charter Oak	Oct. 10, 1887	
3065	Kick, Fred	Aug. 5, 1886	By examination	Marengo	Farmington	Oct. 15, 1895	
3068	Kiedaisch, J., Jr.	Oct. 12, 1886	Graduate	Keokuk.			
3144	Knos, Lars Peter	Mar. 1, 1887	By examination	Des Moines	Sioux City	Nov. 1, 1888	
3145	Kriebs, George	Mar. 1, 1887	By examination	Elkport.			
3199	Klopp, J. J.	May 10, 1887	By examination	Estherville.			
3216	Kirk, A. M.	April 7, 1887	By examination	Cedar Rapids	Des Moines	Feb. 21, 1895	Out of business.
3277	Karterman, M. R.	July 11, 1887	By examination	Ida Grove.			
3323	Killheffer, J. F.	Sept. 20, 1887	By examination	Hull	Clinton	July 15, 1895	
3380	Kessler, Joseph	Feb. 7, 1888	By examination	Cumberland	Auburn	July 11, 1891	
3381	Kiehl, R. S.	Feb. 8, 1888	By examination	Anita.			
3408	Kennedy, A. L.	Feb. 22, 1888	By examination	Newton.			
3441	Kessing, J. J.	April 17, 1888	By examination	Iowa City	Cummings	Sept. 15, 1895	
3545	Kent, Charles F.	Oct. 24, 1888	Graduate	Cedar Rapids	De Witt	April 15, 1892	
3611	Koontz, J. F.	Mar. 5, 1889	By examination	R ssville	Humboldt	May 30, 1893	
3628	Koechert, P. H.	Mar. 26, 1889	Graduate	Davenport.			
3697	Kinyon, Leslie W.	Aug. 3, 1889	By examination	Vail.			
3709	Koeneman, E. O.	Aug. 20, 1889	By examination	Hubbard	Whitten	June 2, 1891	
3763	Kramer, C. F.	Nov. 5, 1889	By examination	McGregor.			
3769	Kistenmacher, E.	Nov. 19, 1889	By examination	Davenport.			
3816	Kettlewell, C. L.	Jan. 31, 1890	By examination	Iowa City	Carson	Feb. 12, 1891	
3824	Kenefick, T. H.	Feb. 10, 1890	By examination	Ackley	Belmond	Dec. 12, 1891	
3855	Klise, J. F.	Mar. 18, 1890	By examination	Le Mars	Sioux City	Dec. 31, 1892	
3872	Koobs, H. J. G.	April 8, 1890	By examination	Paullina	Alvord	July 14, 1893	
115	Keller, George R.	June 12, 1880	As owner	Wapello	...	...	Out of business.
207	Kolls, Conrad A.	June 4, 1880	As owner	Ackley.			
436	Kemmerer, C. T.	June 14, 1880	As owner	Eldridge Junction.			
440	Koch, Peter T.	June 2, 1880	As owner	Davenport.			
508	Keeler, Riley	June 4, 1880	As owner	Sidney.			
543	Kirkwood, T. J.	June 23, 1880	As principal	Otley.			
544	Kirkwood, J. W.	June 5, 1880	As assistant	Otley.			

683	Kerr, David A.	June 1, 1880	As owner	Keokuk.			
691	Kiedaisch, J. F.	June 7, 1880	As owner	Keokuk.			
754	Kettering, S.	June 10, 1880	As owner	Lisbon.			
843	Kempf, Albert	June 9, 1880	As assistant	Monticello.			
903	Kennedy, M. G	June 26, 1880	As owner	McGregor.			
939	Kiisel, Henry L.	June 8, 1880	As owner	Newton.			
1170	Keables, B. F	July 12, 1880	As owner	Pella.			
1171	Keables, J. B	July 12, 1880	As assistant	Pella.			
1529	Kenyon, T. F	July 24, 1880	As owner	Jesup.			
1705	Kees, John.	Aug. 16, 1880	By examination	Chariton	Creston	Mar. 16, 1887	
1798	Knaul, Rudolph.	Aug. 12, 1880	By examination	Denison.			
1800	Krebe, J. T	Sept. 10, 1880	By examination	Muscatine.			
1921	Knapp, C D.	Sept. 6, 1880	By examination	Greenfield.			
1978	Keables, H. S.	Jan. 12, 1881	As principal	Pella.			
2063	Kaufman, E. J.	Mar. 22, 1881	By examination	Waverly.			
2067	Keeling, James H.	Jan. 13, 1881	By examination	Steamboat Rock			In Illinois.
2155	King, Albert E	June 15, 1881	By examination	Bedding	Blockton	Feb. 18, 1895	
2167	Kuenzel, H. C.	July 9, 1881	By examination	Garnavillo.			
2250	Koto, P. C.	Oct. 17, 1881	By examination	Forest City.			
2288	King, Thomas F.	Dec. 9, 1881	By examination	Lineville.			
2333	Kirk, Charles R.	Jan. 28, 1882	By examination	Moulton	Chariton	May 23, 1884	
3995	Kirby, S. C.	Feb. 17, 1891	By examination	Grand Junction.			
4050	Kauffman, A.	May 6, 1891	By examination	Waverly	Centerville	Sept. 16, 1895	
4116	Koch, Francis J	Sept. 15, 1891	Graduate	Davenport.			
4156	Koeberle, Theo. A	Dec. 12, 1891	Graduate	Waverly	Sumner	Mar. 21, 1892	
4196	Keef, Matt J	Mar. 3, 1892	By examination	Waterloo	Waterloo	April 14, 1894	
4249	Kramme, H. W	June 21, 1892	By examination	Laurel	Barnes City	June 20, 1893	
4307	Kinyon, C. P.	Sept. 6, 1892	By examination.	Ottumwa	Des Moines	Feb. 26, 1897	
4405	Kullmer, John	Mar. 21, 1893	Graduate	Dysart			
4481	Kueny, Frank M	April 4, 1893	By examination	Danbury	Sioux City.	Mar. 19, 1895	
4516	Kaiser, Theo	Sept. 5, 1893	By examination.	Ottumwa.			
4556	Kaplan, Jay Gould	Dec. 5, 1893	By examination	Rock Rapids.			
4603	Knapp, Miss Georgina.	Mar. 8, 1894	By examination	Hull	Rock Valley	July 7, 1897	
4604	Kent, C. W.	Mar. 8, 1894	By examination	Hampton.			
4669	Kranz, George F	June 5, 1894	By examination.	Bellevue.			
4708	Ketterer, George A	Aug. 6, 1894	By examination	Gowrie.			
4712	Klenze, John E.	Aug. 14, 1894	By examination	Davenport.			
4730	Kiner, F. C.	Sept. 4, 1894	By examination	Ida Grove.			
4753	Kidd, Mrs Emma F.	Oct. 2, 1894	By examination	Riverton.			
4801	Keltz, Bert F	Jan. 2, 1895	By examination.	Webster City.			
4816	Kehm, Conrad	Feb. 5, 1895	By examination.	Fort Dodge.			
4844	Kallem, James Loren	Mar. 16, 1895	Graduate	Tama	Chelsea	Jan. 7, 1896	
4861	Kloster, Ben J	April 2, 1894	By examination	Sioux City.			
4870	Kingery, J. K.	April 16, 1894	By examination	Creston	Orient	Jan. 7, 1896	
4893	Kissel, George	July 9, 1895	By examination	Cresco.			
4905	Kidd, Fred C	June 26, 1895	By examination	Oelwein.			
4962	Knudson, L C.	Dec. 17, 1895	By examination	Montour.			
4990	Klein, H. W.	Feb. 11, 1896	By examination	Rock Rapids.			
5016	Kennedy, C. S.	Mar. 3, 1896	By examination	Logan	Whiting	Mar. 10, 1897	
5025	Kucheman, B. F	Mar. 24, 1896	By examination	Bellevue	Newell	July 20, 1897	

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
5029	Kinsinger, E. D	April 7, 1896	By examination	Bloomfield.			
5044	Kendall, Charles	April 7, 1896	By examination	Fredericksburg.			
5059	Klise, W. J	April 7, 1896	By examination	Le Mars.			
5117	Kuntson, G. W	June 5, 1891	By examination	Callender.			
5166	Kaiser, W. O	Nov. 10, 1896	By examination	Des Moines	Burlington	Mar. 22, 1897	
5179	Kuast, Julius	Dec. 1, 1896	By examination	Ogden.			
5190	Koch, A. F	Dec. 14, 1897	By examination	Middle Amana.			
5237	Koeneman, W. E	April 6, 1897	By examination	Whitten.			
5290	King, R. C	July 6, 1897	By examination	Emmetsburg.			
7	Lont, C. B	June 7, 1880	As owner	Delaware.			
160	Long, G. P	June 16, 1880	As assistant	Perry			
226	La-Nicca, M. J. G	June 5, 1880	As owner	Dubuque.			
536	Livermore, C. A	June 24, 1880	As owner	Cascade.			
720	Livingston, Hugh	June 3, 1880	As owner	Hopkinton.			
732	Lichty, Norman	June 25, 1880	As owner	Des Moines.			
832	Lyon, Smith	June 4, 1880	As owner	Mount Pleasant.			
847	Landis, S. L	June 17, 1880	As owner	Marray			Out of business.
1027	Lezotte, Charles H	June 18, 1880	As principal	Osage.			
1051	Litchfield, A. N	June 4, 1880	As owner	Pleasantville.			
1156	Lander, Charles J	June 6, 1880	As owner	Marshalltown.			
1210	Lawrence, William R	June 26, 1880	As owner	Sibley.			
1320	Lindley, B. B	June 28, 1880	As owner	Winfield.			
1386	Loucks, R. H	July 12, 1880	As owner	Danbury.			
1423	Lamoreux, R. H	July 12, 1880	As owner	Sac City			Devers, Texas.
1473	Lewis, Edward H	July 20, 1880	As assistant	Sioux City.			
1701	Langheim, J. M	Aug. 7, 1880	By examination	Davenport	Charlotte	Mar. 22, 1882	
1706	Lundy, W. L	Aug. 9, 1880	By examination	Coin	Clarinda	Mar. 22, 1882	
1713	Loper, John C	Aug. 30, 1880	As owner	Des Moines.			
1954	Lowry, J. J	Jan. 3, 1881	As owner	Cresco			
2005	Lanterman, L. C	Dec. 29, 1880	By examination	Cedar Rapids	Cedar Rapids	Aug. 17, 1891	
2010	Loper, James H	Feb. 7, 1881	By examination	Des Moines.			
2012	Lewis, Charles H	Jan. 19, 1881	By examination	Des Moines			In California.
2074	Lane, Lewis L	April 11, 1881	By examination	Muscatine			Out of business.
2130	Layton, H. R	May 25, 1881	By examination	Leon.			
2161	Lax, Frederick	July 8, 1881	By examination	Colo.			
2318	Lass, D. G	Sept. 22, 1881	By examination	Webster City	Rodney	Mar. 15, 1893	

2286	Leibig, Rosa K	Sept. 1, 1881	By examination	Marshalltown			In Portage, Wis.
2316	Lynch, L. J	Dec. 19, 1881	By examination	Villisca.			
2391	Little, M. A	April 4, 1882	By examination	Casey	Des Moines	Feb. 18, 1896	
2460	La Grange, Theo	May 25, 1882	By examination	Marion.	Reinbeck	April 7, 1883	In Egan, S. Dak
2475	Loser, A. B	June 9, 1882	By examination	Lake City.			
2507	Law, William	Aug. 2, 1882	By examination	Liberty Center			Out of business.
2530	Laney, J. W	Sept. 6, 1882	By examination	Decatur	Davis City	Mar. 12, 1887	
2532	Loose, D. N	Sept. 14, 1882	By examination	Maquoketa.			
2555	Leech, Louis J	Dec. 19, 1882	By examination	West Branch			Out of business
2625	Lovejoy, Walter	April 26, 1883	By examination	Rippey			In Wyoming.
2641	Lawrence, Edward	May 29, 1883	By examination	Osceola.			
2676	Landon, O. M	Aug. 8, 1883	By examination	Lawler.			In Hampton.
2757	Louis, Henry	May 26, 1884	By examination	Iowa City.			
2776	Lamberson, W. B	June 30, 1884	By examination	Columbus Junction	Nora Springs	Mar. 29, 1894	
2797	Lacy, George	Sept. 2, 1884	By examination	Luverne.			
2821	Legel, John G	Dec. 16, 1884	By examination	Charles City.			
2858	Lande, Amos A	April 8, 1885	By examination	Sheldahl	Slater	Sept. 7, 1887	
2871	Lewis, Rowland	April 21, 1885	By examination	Nevada			In Michigan.
2901	Lawrence, Harry	July 7, 1885	By examination	Osceola			
2906	Lenocker, A. A	July 23, 1885	By examination	Des Moines	Oakland	Jan. 18, 1886	
2925	Longheckard, A	Sept. 15, 1885	By examination	Independence			Out of business.
2989	Lawrence, Ezra C	Mar. 4, 1886	By examination	Waterloo	Des Moines	Mar. 26, 1889	
3099	Lee, J. Allison	Oct. 16, 1886	By examination	Lone Tree	Lisbon	July 25, 1888	
3120	Loar, D. W	Jan. 18, 1887	By examination	Monroe			In Nebraska.
3123	Leland, W. L	Feb. 1, 1887	By examination	Hawarden.			
3194	Landis, Jesse E	Feb. 12, 1887	By examination	Murray	Osceola	Jan. 7, 1894	
3233	Lakin, A. M	May 2, 1887	By examination	Yale	(For Yale only).		
3258	Landon, Judd E	June 7, 1887	By examination	Lawler.			
3289	La Grange, O. D.	Aug. 5, 1887	By examination	Garrison			Out of business.
3298	Longwell, Jesse	Aug. 16, 1897	By examination	Wellman.			
3306	Lemmon, A. D.	Sept. 1, 1887	By examination	Guthrie Center.			
3364	Little, Charles	Jan. 17, 1888	By examination	Lamont.			
3394	Lindly, J. M.	Feb. 22, 1888	By examination	Winfield.			
3454	Liek, Charles W	May 14, 1888	By examination	Dubuque.			
3473	Leech, Oliver J	June 13, 1888	By examination	Iowa City			In Missouri.
3485	Lewis, G. W	July 11, 1888	By examination	Grinnell.			
3489	Lander, Will R	July 17, 1888	By examination	Marshalltown	Sioux City	Mar. 8, 1889	
3501	Laughlin, M. R	Aug. 8, 1888	By examination	Boone	Perry	Mar. 13, 1897	
3512	Lawhead, W E	Aug. 28, 1888	By examination	Redding			Out of business.
3531	Lawrence, E. S	Sept. 11, 1888	By examination	Des Moines.			
3629	Leith, George E	Mar. 13, 1889	By examination	Creston	Silver City	May 28, 1893	
3636	Leach, James W	April 9, 1889	By examination	Creston.			
3658	Lundvail, N. A	May 21, 1889	By examination	Dayton	Sioux Rapids	Oct. 14, 1890	
3699	LaPenotiere	Aug. 6, 1889	By examination	Grand Junction.			
3716	LaForce, D. A	Aug. 28, 1889	By examination	Ottumwa.			
3739	Love, Charles	Sept 18, 1889	By examination	New Market.			
3751	Larson, Victor A	Oct. 15, 1889	By examination	Burlington			In Chicago.
3778	Lillis, L. M	Dec. 9, 1889	By examination	Marion.			
3790	Loomis, F. W	Dec. 23, 1889	By examination	Shannon City.			
3793	Lloyd, James H	Jan. 2, 1890	By examination	West Branch.			

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
3803	Listebarger, L. H	Jan. 24, 1890	By examination	Cedar Rapids	....	....	Out of business.
3805	Laubach, C. A	Jan. 25, 1890	By examination	Blairstown	Keokuk	Oct. 30, 1890	
3836	London, L. W	Feb. 26, 1890	By examination	Osceola.			
3847	Liers, Frank	Mar. 12, 1890	By examination	Clayton City.			
3854	Larsen, T. S	Mar. 18, 1890	By examination	Fort Dodge.			
3916	Lies, Michael E	July 28, 1890	By examination	Dubuque	Denison	Mar. 2, 1893	
3928	Lloyd, Burton W	Sept. 2, 1890	By examination	Sioux City	....	....	In Colorado.
3960	LaGrange, T. G	Nov. 12, 1890	By examination	Garrison	Vinton	Nov. 25, 1890	
4046	Leach, John A.	May 5, 1891	By examination	Creston	Greenfield	June 9, 1896	
4059	Lampe, T. J.	May 19, 1891	By examination	Wall Lake	Westpoint	Oct. 8, 1896	
4097	Lewis, Alfred W	Aug. 11, 1891	By examination	Inwood.			
4187	Lewis, John A	Oct. 10, 1891	By examination	Manning.			
4291	Landgraf, F. J	Aug 17, 1892	Graduate	Waterloo.			
4296	Ladage, Henry W	Aug. 31, 1892	By examination	Grundy Center.			
4318	Luce, John	Oct. 4, 1892	By examination	Villisca.			
4335	Lounsberry, J. B	Nov. 29, 1892	By examination	Des Moines	Valeria	Sept. 21, 1896	
4338	Longran, Thomas J.	Dec. 6, 1892	By examination	Ames.			
4396	Lowery, O. W.	Mar. 14, 1893	By examination	Grand Junction.			
4410	Latimer, Glen M	Mar. 7, 1893	By examination	Independence	....	....	In New Mexico.
4415	Larmon, A	Mar 8, 1893	By examination	Manson	Mt. Ayr	Nov. 16, 1896	
4434	Latta, K. C	April 5, 1893	By examination	Paton.			
4471	Larson, Charles O	June 6, 1893	By examination	Burlington.			
4472	Luehrs, Otto G	June 6, 1893	By examination	Cherokee	Remsen	Feb. 6, 1894	
4488	Liddell, Walter T	July 7, 1893	By examination	Des Moines.			
4494	Lamer, William	Aug. 1, 1893	By examination	Newton	Centerville	Dec. 26, 1895	
4579	Lehman, Max	Feb. 6, 1894	By examination	Remsen	Minden	Sept. 17, 1895	
4588	Loring, John Mid	Feb. 17, 1893	By examination	Dallas Center	Ottumwa	Sept. 24, 1895	
4592	Little, Charles A.	Mar. 6, 1894	By examination	Lamont.			
4601	Larson, C. W	Mar. 6, 1894	By examination	Stanton	Ottumwa	Mar. 14, 1896	
4619	Luers, John H	April 3, 1894	By examination	Sheldon	Clarinda	May 5, 1894	
4620	Larsen, Edward	April 3, 1894	By examination	Alta.			
4626	Lamson, C. O	April 3, 1894	By examination	Anamosa.			
4677	Love, John G	June 5, 1894	By examination	Lime Springs.			
4743	Logan, G. W.	Sept. 25, 1894	By examination	Fonda.			
4865	Lehan, J. W	Mar. 8, 1894	By examination	Dunlap.			
4868	Lauder, James A	Mar. 28, 1894	By examination	Osceola.			
4885	Lundgrien, Charles W.	May 7, 1895	By examination	Sioux City.			

4696	Lien, Albert E	July 2, 1895	By examination	Eagle Grove	Whittemore	Feb. 14, 1896	
4748	Lambert, G. H	Oct. 2, 1894	By examination	Hampton.			
4759	Loucks, J. C	Oct. 2, 1894	By examination	Danbury	Ida Grove.		
4771	Landis, Samuel E	Nov. 12, 1894	By examination	Murray	Osceola		
4782	Leik, William C	Dec. 4, 1894	By examination	Dubuque.			
4869	Lowery, Fred B	April 2, 1894	By examination	Cresco.			
4879	Loosley, Winfred Ruth	May 7, 1895	By examination	Iowa City.			
4896	Lien, Albert E	July 2, 1895	By examination	Eagle Grove.			
4952	Lenz, J. A	Dec. 3, 1895	By examination	Dubuque.			
4963	Ladage, W. C	Jan. 7, 1896	By examination	Grundy Center.			
4996	Lespinasse, A. F. H. de	Feb 4, 1896	By examination	Orange City	Oakville	Aug. 23, 1896	
5015	Lowder, William	Mar. 3, 1896	By examination	Ledyard.			
5020	LeDue, A. H	Mar 3, 1896	By examination	Breda.			
5037	Lee, T. M	April 4, 1896	By examination	Lisbon.			
5084	Legro, S W	May 5, 1896	By examination	Boone.			
5133	Ludolph, H. W	Sept. 1, 1896	By examination	Clinton.			
5167	Lyon, Charles	Nov. 10, 1895	By examination	Pleasantville	Bussey	April 5, 1897	
5231	Lagerquist, V. N	Mar. 2, 1897	By examination	Gowrie.			
5258	Lafrenz, H. T	April 6, 1897	By examination	Davenport.			
5267	Lewis, J. W	May 4, 1897	By examination	Oskaloosa.			
5283	Lane, F. L	June 1, 1897	By examination	Perry.			
5286	Litzrodt, E. P	Aug. 1, 1897	Graduate	Council Bluffs.			
5291	Large, J. B	July 6, 1897	By examination	De Witt.			
5292	Lerch, Fred, Jr	July 6, 1897	By examination	Sioux City.			
147	Moore, John B	June 14, 1880	As owner	Emerson.			
169	Mullan, M. F	June 4, 1880	As owner	Pomeroy.			
176	McGuire, J. G	June 4, 1880	As owner	Anamosa.			
188	McKenzie, H, M	June 19, 1880	As owner	Elwood.			
189	McKenzie, E. M	June 19, 1880	As assistant	Elwood.			
278	Morrison, J. C	June 10, 1880	As owner	Albia.			
279	Morrison, Ella A	June 10, 1880	As assistant	Albia.			
282	Major, E. E	June 3, 1880	As owner	Anita.			
283	Montgomery, G. S	June 7, 1880	As owner	Atlantic			Out of business.
285	Mitchell, John H	July 17, 1880	As owner	Bloomfield			Out of business.
287	Mitchell, William S	June 17, 1880	As owner	Bloomfield			Out of business.
300	McAchran, W. H	June 5, 1880	As assistant	Bloomfield.			
363	Major, Oscar	June 9, 1880	As owner	Clinton.			
365	McCreary, W. M	June 4, 1880	As owner	Centerville.			
367	Maulsby, Ellis P	June 7, 1880	As assistant	Casey.			
483	Maurid, R	June 23, 1880	As owner	Dysart			Beatrice, Neb.
535	Meisner, Amillus	June 28, 1880	As owner	Davenport.			
578	Morden. W. C	June 7, 1880	As owner	Fulton			Out of business.
604	McCullough, M. J	June 17, 1880	As owner	Menlo.			
605	McCullusky, M. H	June 19, 1880	As owner	Glenwood			Out of business.
638	Mann, James	June 7, 1880	As owner	Hamburg.			
695	McGrath, M. J	June 7, 1880	As owner	Keokuk.			
699	McFarlane, D	June 17, 1880	As principal	Keota.			
716	Montgomery, W. H	June 28, 1880	As owner	Decorah			Out of business.
758	Markley, G. H	June 9, 1880	As owner	Lansing.			

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
901	Munger, J. P.	June 4, 1880	As owner	Malvern.			
915	Mallory, Dwight	July 2, 1880	As owner	Boonsboro.			
916	Mallory, Adela	July 2, 1880	As assistant	Boonsboro.			
981	Miles, A. H	July 6, 1880	As owner	Des Moines.			
1011	Mills, C. J.	June 4, 1880	As owner	Ossian.			
1036	Morgan, J. W	June 3, 1880	As owner	Oskaloosa.			
1053	Mealy, D. H.	June 4, 1880	As owner	Pleasant Plain.			
1075	Marietta, J. C.	June 5, 1880	As owner	Palmyra			
1122	Miles, Henry F	July 6, 1880	As owner	Charles City.			
1124	Miles, Wilber F.	July 6, 1880	As owner	Charles City.			
1140	McDermid, Peter	June 30, 1880	As owner	Fontanelle.			
1192	Mather, William	June 11, 1880	As owner	Springdale.			
1193	Mather, Charles E	June 12, 1880	As owner	Springdale.			
1214	Moore, William G.	June 28, 1880	As owner	Silver City.			
1409	McBride, William S.	July 13, 1880	As owner	Marshalltown.			
1506	Moon, Milton J	July 23, 1880	As owner	Iowa City.			
1672	McEwen, C. A.	July 30, 1880	By examination	Independence.			
1804	Morey, James P.	Aug. 2, 1880	By examination	Storm Lake	Des Moines.		
1841	Marolf, J. F.	Nov. 16, 1880	As assistant	Wilton			
1878	McDonald, J. W.	Oct. 21, 1880	By examination	Morning Sun	Mason City	Oct. 23, 1890	Out of business.
1977	Moore, G R	Dec. 6, 1880	By examination	Garfield	Oxford Junction.		
1988	Meacham, J. E.	Dec. 18, 1880	By examination	Clarinda	....	....	Left the state.
2059	Molesworth, J.	April 26, 1881	By examination	Norwood,	....	....	In Kansas.
2060	Masters, S. H	April 27, 1881	By examination	Marne	Terrill	Nov. 12, 1895	
2080	Merritt, W. H.	April 20, 1881	By examination	Hartford	Pleasantville	Mar 10, 1890	Out of business.
2123	Martin, M. T.	May 17, 1881	By examination	Woodburn.			
2138	McLain, George H	June 18, 1881	By examination	Vail	Clinton	April 13, 1889	
2143	McElwain, R. H.	June 6, 1881	By examination	Clarksville	Hardy	Dec. 31, 1895	
2148	Mitchell, A. L.	April 28, 1881	By examination	Macedonia.			
2149	Maxwell, J. P.	April 30, 1881	By examination	Westerville.			
2162	McGonigle, W. A.	July 11, 1881	By examination	Monona	Farmersburg	June 10, 1897	
2235	McDermid, D., Jr.	Oct. 7, 1881	By examination	Victor	Muscatine	....	Out of business.
2267	Mitchell, Enos	Nov. 11, 1881	By examination	Weldon.			
2284	Marshall, A. J	Dec. 3, 1881	By examination	Shelby	Blairsburg	Sept. 17, 1891	
2318	McColm, J. T	Dec. 24, 1881	By examination	Gravity.			
2395	McClees, C. H.	April 11, 882	By examination	Marne.			
2409	McColm, C. B.	April 8, 1882	By examination	Hepburn,	Persia	Nov. 20, 1896	

2458	McMechan, J. W	May 24, 1883	By examination	Boone.			
2476	McClintock, J. M	June 9, 1883	By examination	Monroe	Adair	April 13, 1891	
2516	McNab, Alex	Aug. 22, 1883	By examination	Rock Rapids	....	....	Out of business.
2517	Mitchell, And. F	Aug. 31, 1883	By examination	Keota	Marshalltown	April 4, 1892	
2561	McBride, H. E	Feb. 6, 1883	By examination	Ames	Des Moines	July 16, 1883	
2569	Montross, George D	Jan. 17, 1883	By examination	Sloan.			
2571	Macfarlane, Thomas	Jan. 27, 1883	By examination	Mondamin.			
2578	McBride, C M	Feb. 26, 1883	By examination	Rock Valley.			
2583	Monnett, H. V	Mar. 2, 1883	By examination	Orient	....	....	Out of business.
2611	Mayer, Peter	April 8, 1883	By examination	Marshalltown.			
2690	Marotz, F. W	Aug. 25, 1883	By examination	Sergeant's Bluffs.			
2714	Moffet, Thomas M	Jan. 21, 1884	By examination	Grundy Center.			
2717	Mateer, John D	Feb. 5, 1884	By examination	Cedar Rapids.			
2751	Marnin, George S	May 20, 1884	By examination	Cedar Falls.			
2778	McMillan, E. C	July 15, 1884	By examination	Coon Rapids	....	....	In Nebraska.
2779	Myers, S C	July 15, 1884	By examination	Schaller	Rossville	Aug. 26, 1885	
2803	Maynard, J. D	Sept. 2, 1884	By examination	Janesville	....	....	Out of business.
2808	Mann, A. W	Oct. 7, 1884	By examination	Orange City	Onawa	Mar. 31, 1886	
2826	Masterson, J. B	Jan. 5, 1885	By examination	Albion.			
2843	Mack, George J	Mar. 8, 1885	By examination	Waterloo	....	....	Out of business.
2874	Morgan, Dell G	May 11, 1885	By examination	Council Bluffs.			
2885	Morgan, Benjamin A	May 28, 1885	By examination	Marshalltown.			
2898	Miller, T. L	June 11, 1885	By examination	South English	Murray	Jan. 8, 1887	
2913	More, Charles W	Aug. 11, 1885	By examination	Janesville	....	....	In Minnesota.
2920	Macy, Sherman R	Sept. 7, 1885	By examination	Bloomfield	Des Moines	Jan. 26, 1891	Out of business.
2927	Myers, W. E	Oct. 6, 1885	By examination	New Hampton	Lamoni	Dec. 11, 1895	
2935	McNamara, J. F	Oct. 15, 1885	By examination	Des Moines	Fort Dodge	Nov. 2, 1886	
2945	Miller, E. C	Nov. 17, 1885	By examination	Rockwell.			
2953	McCormick, F. M	Jan. 4, 1886	By examination	Baldwin.			
2957	McMichael, A. O	Jan. 5, 1886	By examination	Des Moines	Fonda.		
2959	McFarland, A. W	Jan. 6, 1886	By examination	Dakota City.			
2961	Miller, Severin	Jan. 19, 1886	By examination	Davenport.			
2983	Mulnix, J. A	Feb. 16, 1886	By examination	Dows.			
2993	Moore, Silas H	May 8, 1886	Graduate	Sioux City.			
2994	More, Arthur J	May 17, 1886	Graduate	Sioux City.			
3001	Medberg, J. N	May 4, 1886	By examination	Webster City.			
3070	Morse, Charles H	Sept. 7, 1886	By examination	Eagle Grove.			
3073	McKay, Frank P	Sept. 18, 1886	By examination	Des Moines.			
3084	Merrill, John T	Oct 5, 1886	By examination	Mt. Ayr.			
3094	May, George E	Nov. 8, 1886	By examination	Charles City.			
3101	Miller, U. E	Nov. 22, 1886	By examination	Cedar Rapids	Grinnell	Feb. 11, 1893	Out of business.
3109	Morton, O. B	Dec. 17, 1886	By examination	Perry.			
3127	McKay, B. A	Mar. 1, 1887	By examination	Missouri Valley.			
3170	McKinnis, O	Mar. 8, 1887	By examination	Ollie.			
3185	Maxwell, W. J	Mar. 30, 1887	By examination	Avoca.			
3207	Machesney, W. T	April 5, 1887	By examination	Bagley.			
3223	Mason, G. W	April 19, 1887	By examination	Goldfield	....	....	In Corwith.
3234	McClain, O	May 3, 1887	By examination	Atlantic	Randolph	Dec. 16, 1896	
3249	McWilliams, J. J	May 17, 1887	By examination	Charter Oak.			
3290	Morgan, Fred E	Aug. 13, 1887	By examination	Cromwell	Logan	Aug. 12, 1892	

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
3365	Mullarky, W. G.	Jan. 18, 1888	By examination	Holland.			
3373	Moore, Alfred E.	Feb. 7, 1888	By examination	Wayland.			
3378	Morris, Daniel J	Feb. 1, 1888	By examination	Angus.			
3382	Mowerer, J. R	Feb. 9, 1888	By examination	Washta	Cherokee	Mar. 27, 1897	
3383	Matthews, G. W	Feb. 13, 1888	By examination	Lenox.			
3404	McBride, R. W.	Feb. 28, 1888	By examination	Marshalltown.			
3414	Morgan, F. L.	Mar. 6, 1888	By examination	Des Moines	Perry	May 31, 1889	
3422	Mitchell, A. S.	Mar. 20, 1888	By examination	Marion			In Illinois.
3443	Marsh, F. A.	April 17, 1888	By examination	Malvern			In Nebraska.
3448	Mollenhoff, J. P	Sept. 29, 1887	By examination	Stanton.			
3450	Mollison, W. T	May 9, 1888	Graduate	Ottumwa.			
3467	Mulhern, J. W	June 5, 1888	By examination	Greenfield			Out of business.
3510	Meyers, Ed. G	Aug. 21, 1888	By examination	Reinbeck.			
3513	Maury, James.	Aug. 24, 1888	By examination.	Cedar Falls			Out of business.
3526	Matthews, W. H.	Sept 4, 1888	By examination.	Delta	Des Moines	July 8, 1891	
3539	Medowell, A.	Oct. 4, 1888	By examination	Galva	Little Cedar	Feb. 1, 1897	
3571	Morgan, James W.	Jan. 1, 1888	By examination	Columbus City	Tipton	Sept. 16, 1895	
3575	Myers, J L	Jan. 3, 1889	By examination	Audubon.			
3612	Myers, P. B	Mar. 6, 1889	By examination	Iowa City			In Nebraska.
3619	Mershon, G. A	Mar. 13, 1889	By examination.	Bayard	Liscomb	April 6, 1897	
3627	McKibbin, C A.	Mar. 5, 1889	Graduate	Bloomfield	Milton	Nov. 1, 1895	
3634	McCormick, R. R	April 2, 1889	By examination	Clinton	Clinton	Oct. 1, 1892	
3648	McCandless, H. A.	April 22, 1889	By examination	Cedar Rapids.			
3661	McCallan, R. J	May 21, 1889	By examination	Audubon			Out of business.
3670	Merrill, W. F.	June 4, 1889	By examination	Aurelia	Sioux City	Aug. 6, 1890	
3720	Moody, Clarke B	Sept. 3, 1889	By examination	Plainfield	Iona	May 28, 1891	
3738	McCulloch, George	Sept. 17, 1889	By examination	Humeston.			
3743	Mahnke, George	Oct. 1, 1889	By examination	Des Moines.			
3746	Moore, G. A.	Oct. 1, 1889	By examination	Atalissa	West Liberty	May 2, 1894	
3801	Moetzel, E. A.	Jan. 21, 1880	By examination	Des Moines	Davenport.	Mar. 11, 1891	
3809	Miller, H. D	Jan. 29, 1880	By examination	Stanwood	Beaman	Mar. 5, 1896	
3841	Mulnix, A B	Mar. 4, 1890	By examination	Dows.			
3814	Mills, J. L.	Mar 6, 1890	By examination	Harlan.			
3846	McCague, Sidney.	Mar. 11, 1890	By examination	Clinton.			
3883	McColm, J. L.	April 21, 1890	By examination	Persia	Panama.	Feb. 24, 1896	
3890	Meinert, Fred G.	May 7, 1890	By examination	Remsen.			
3901	McConnell, P. G.	June 24, 1890	By examination	Cresco	Grinnell	May 11, 1891	

3920	Meisner, Ernest	Aug. 5, 1890	By examination	Reinbeck.			
3926	Minthorn, M. F	Sept. 2, 1890	By examination	Moorhead.			
3947	Miller, Charles I	Oct. 7, 1890	By examination	Galva.			
3949	Miller, Frank T	Oct. 10, 1890	By examination	Iowa City	Germania	Oct. 12, 1894	
3964	Mulder, D	Dec. 2, 1890	By examination	Sioux Center			Out of business.
3969	Mendenhall, J. R	Dec. 26, 1890	By examination	Earlham	Menlo	Jan 11, 1894	
4010	Miller, Ralph H	Mar. 7, 1891	By examination	Waterloo	Stratford.		
4047	McDonald, J. E	May 5, 1891	By examination	Independence	Rowley	June 19, 1893	
4068	Mitchell, Mrs. E. H	June 2, 1891	By examination,	Weldon.			
4105	McKelvey, W. O	Sept. 2, 1891	Graduate	Greenfield.			
4132	McMillan, R. A	Nov. 3, 1891	By examination	Iowa City		—— —, 1894	Genoa, Neb.
4144	Mond. C L.	Nov. 18, 1891	By examination.	Ute	Ute	—— —, 1893	
4145	McMackin, W. W	Nov. 23, 1891	By examination.	Lake City.			
4164	Mead, N	Jan. 26, 1892	By examination	Akron.			
4169	McGaheran, J C	Feb. 1, 1892	By examination	La Porte City			
4177	Mudge, L. H.	Feb. 9, 1892	By examination	Blanchard	Council Bluffs	June 6, 1896	
4180	Moffet, Benjamin F	Feb. 16, 1892	By examination	Clinton.			
4198	Michael, H. G	Mar. 3, 1892	By examination	Iowa City			Out of business.
4212	Mullins, U. S	April 5, 1892	By examination	Atlantic.			
4219	Morgan, Miles M	April 18, 1892	By examination	Des Moines.			
4242	McGarvey, S. B	June 7, 1892	By examination	Belle Plaine	West Side	Oct. 10, 1893	
4245	Matthews, F. A	June 7, 1892	By examination	Algona	Spencer	Oct. 19, 1895	
4255	Martin, D T	June 29, 1892	By examination	Pomeroy.			
4269	McArthur, F H	July 7, 1892	By examination	Des Moines.			
4277	Mathews, Charles W	July 23, 1892	By examination	Pulaski.			
4282	McDaniel, A. B	Aug. 2, 1892	By examination	Swan	Afton	Feb. 16, 1897	
4305	Moore, Charles F	Sept. 16, 1892	By examination	Sioux City	Des Moines	—— —, 1895	
4321	McCorkle, G. E	Oct. 4, 1892	By examination	Shellsburg.			
4330	Merryman, George E.	Nov. 9, 1892	By examination	Iowa City		—— —, 1895	Out of business.
4340	Mewhor, J. C	Dec. 6, 1892	By examination	Riverton.			
4373	Mackrill, W. A	Feb. 3, 1893	By examination	Onslow.			
4403	Moline, Oscar G	Mar. 14, 1893	By examination	Des Moines	Ridgeway	July 6, 1897	
4409	McGuin, George B	Mar. 7, 1893	By examination	Grinnell.			
4433	McCurnin, T. P	April 4, 1893	By examination	Des Moines.			
4436	Mewhirter, H	April 11, 1893	By examination	Paullina			In South Dakota.
4438	McKown, J. W	April 21, 1893	By examination	Cedar Rapids.			
4443	McMartin, C. S	May 2, 1893	By examination	Rock Valley	West Union	Mar. 31, 1894	
4452	McMeel, E. C	May 9, 1893	By examination	Lost Nation	Delmar Junction	Aug. 1, 1894	
4453	Marner, W. R	May 9, 1893	By examination	Miles.			
4459	McCoy, John R	May 25, 1893	By examination	Seymour.			
4463	McKay, Charles A	May 30, 1893	By examination	Des Moines.			
4497	Miller, George	Aug. 1, 1893	By examination	Dallas Center	Churdan	May 15, 1897	
4500	Moreheart, William J	Aug. 7, 1893	By examination	Sioux City			In Minnesota.
4511	May, B. Wood	Sept. 5, 1893	By examination	Charles City.			
4515	Moore, Charles W	Sept. 5, 1893	By examination	Birmingham	New London	Oct. 9, 1894	
4523	Morrison, W W	Sept. 15, 1893	By examination	Iowa City			Out of business.
4525	Morrison, Theo L	Oct. 3, 1893	By examination	Seymour.			
4531	McMechan, James	Oct. 3, 1893	By examination	Boone.			
4532	Maytag, T. H	Oct. 21, 1893	By examination	Laurel.			
4548	McComber, G. B	Nov, 28, 1893	By examination	Cascade	Maynard	April 25, 1894	

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
4568	Miller, George D	Nov. 1, 1893	By examination	Albia.			
4591	Marshall, C. J	Mar. 6, 1894	By examination	Ackley	Marshalltown	May 24, 1894	
4598	Mettlin, A. J	Mar. 6, 1894	By examination	Oelwein.			
4606	Miller, James A	Mar. 6, 1894	By examination	Eddyville			In Pennsylvania
4609	Miles, C. W	Mar. 14, 1894	Graduate	Charles City.			
4611	McBride, W H	Mar. 6, 1894	By examination	Muscatine.			
4617	Merner, D C	April 3, 1894	By examination	Cedar Falls.			
4625	Marsh, Walter K	April 3, 1894	By examination	Fairfield	Batavia	May 29, 1897	
4637	McElroy, E. K	April 17, 1894	By examination	Clare	Ayrshire	Aug. 24, 1894	
4642	McKeehon, W. H	April 17, 1894	By examination	Ft. Madison.			
4651	Mosher, A. H	May 1, 1894	By examination	Ireton.			
4660	McMeel, J. H	June 5, 1894	By examination	Lost Nation.			
4667	McConaughy, Earl B	May 5, 1893	By examination	Des Moines.			
4674	Maher, William F	May 16, 1893	By examination	Ft. Dodge.			
4687	Morgan, F. H	July 3, 1894	By examination	Council Bluffs.			
4713	Mullarky, H. J	Sept. 4, 1894	By examination	Manson.			
4716	Mazanti, Henry	Sept. 4, 1894	By examination	Cedar Falls.			
4740	Major, Charles W	May 16, 1893	By examination	Anita.			
4762	McDonald, J. E	Oct. 23, 1894	By examination	Vinton	Van Horne	June 21, 1897	
4815	Miles, Charles L	Feb. 5, 1895	By examination	Charles City.			
4841	McDermid, Pierre	Mar. 12, 1895	By examination	Fontanelle.			
4779	Massenberg, Lou	Nov. 21, 1894	By examination	Council Bluffs.			
4836	Maiden, Walter J	Mar. 5, 1895	By examination	Clearfield	Lenox	Nov. 2, 1895	
4846	Miles, C. C	Mar. 19, 1895	By examination	Des Moines.			
4859	Mulligan, William H	April 2, 1894	By examination	Swaledale.			
4871	McManus, F. W	April 27, 1894	By examination	Gilmore City.			
4872	McCune, Charles H	April 29, 1894	By examination	Creston	Shannon City	Jan. 22, 1897	
4895	Madsen, M P	June 4, 1895	By examination	Jewell Junction.			
4908	Murray, Mrs. Mamie E	July 2, 1895	By examination	Budd			
4912	Mertz, C. Eugene	July 6, 1895	By examination	Lake View	Gray	Dec. 17, 1896	
4934	McGrew, Edw. S	Oct. 1, 1895	By examination	Ainsworth	Tipton	Dec. 16, 1896	
4935	Mallory, J. A	Oct. 1, 1895	By examination	Linden.			
4941	McClanahan, W. A	Nov. 5, 1895	By examination	Redding.			
4946	Mitchell, H. W	Oct. 31, 1895	Graduate	Des Moines.			
4979	Macy, O. E	Jan. 7, 1896	By examination	Pleasanton	Iowa City	April 20, 1896	
5014	McArthur, Wallace	Mar. 3, 1896	By examination	Le Mars.			
5041	Munger, D. M	April 7, 1896	By examination	Waterloo.			

5060	McKay, J. H.	April 7, 1896	By examination.	Buffalo Center.			
5064	Miller, George.	April 21, 1896	By examination.	Conrad.	Olin.	Oct. 29, 1896	
5070	Mutchler, J. S.	May 5, 1896	By examination.	Cedar Rapids.	Iowa City.	July 11, ——	
5071	Moore, O. J	May 5, 1896	By examination.	Manson.	Lohrville.	Mar. 15, 1897	
5081	Minthorn, Edith.	May 5, 1896	By examination.	Moorehead.			
5089	Marshall, O. E	June 2, 1896	By examination.	Iowa Falls.			
5093	Mead, N. P.	June 2, 1896	By examination.	Akron.			
5106	Mosling, A. D	July 7, 1896	By examination.	Forest City.			
5114	Merritt, F. H	June 11, 1895	By examination.	Ossian.			
5116	Moore, E. J	July 1, 1896	By examination.	Eldon.			
5156	Mullarky, E. E	Oct. 6, 1896	By examination.	Holland.			
5168	Myhre, O. G	Nov. 10, 1896	By examination.	Estherville.			
5170	Martin, Dessie	Dec. 1, 1896	By examination.	Jesup.			
5174	Martin, P. J	Dec. 1, 1896	By examination.	Lake City.			
5176	Manion, P. H	Dec 1, 1896	By examination.	Charlotte.			
5187	McClelland. S. F	April 16, 1895	By examination.	Des Moines.			
5189	McCray, W. R	Jan. 14, 1897	By examination.	Marble Rock.			
5191	McMahon, Thomas.	Jan. 14, 1897	By examination.	Victor.			
5198	Milz, W. F.	Feb. 2, 1897	By examination.	Janesville.			
5203	Murray, W. P.	Feb. 2, 1897	By examination.	Melrose.			
5204	Mager. E. W.	Feb. 2, 1897	By examination.	Dunkerton.			
5211	Malloy, J E.	Mar. 2, 1897	By examination.	New Hampton.			
5234	Mammen, M H	April 6, 1897	By examination.	Le Mars.			
5242	Miller, C. J	April 6, 1897	By examination.	Waterloo.			
5243	Miller, D J	April 6, 1897	By examination.	Algona.			
5263	Murrey, W. E	May 4, 1897	By examination.	Des Moines.			
5268	Melzian, H. F	May 4, 1897	By examination.	Burlington.			
5270	Miller, J. J.	May 4, 1897	By examination.	Ackley.			
5293	McGrew, L. W	July 6, 1897	By examination.	Emerson.			
11	Nerby, Levi B.	June 5, 1880	As owner.	Lake Mills.			
50	Nesper, Fred T.	June 10, 1880	As assistant.	Muscatine.			
62	Nunnally, L B.	June 8, 1880	As owner	Hartford.			
128	Newell, W. M.	June 3, 1880	As owner	Russell.		April 7, 1892	
247	Nichols, William M.	June 4. 1880	As owner.	Atlantic.			
272	Nichols, J.	June 24, 1880	As owner.	Atlantic.			
295	Nichols Edward	June 4, 1880	As owner.	Belle Plaine.			
373	North, Henry.	June 8, 1880	As owner	Casey.			
723	Norton, H. M	June 5, 1880	As owner.	Kent.			
1112	Niehaus, E. W.	July 9, 1880	As assistant.	Burlington.			
1472	Nash. A. F.	July 20, 1880	As assistant.	Sioux City.			
1994	Newman, M. M	Dec. 28, 1880	By examination.	Edgewood.			
2164	Nicalse, Gustav.	July 11, 1881	By examination.	Burlington.			In Illinois.
2191	Nauerth, J. H.	Aug. 8, 1881	By examination.	Tama City.	Traer.	April 17, 1885	
2273	Nicol, Ira I	Nov. 12, 1881	By examination.	Lacona.	North English.	April 29, 1887	
2368	Niemann, Theo.	Mar. 6, 1882	By examination.	Maquoketa.	Newell.	Nov. 20, 1886	
2462	Newman, E P.	May 29, 1882	By examination.	Clarion.	Dows.	May 27, 1887	
2556	N tzsche, J. C.	Dec. 27, 1882	By examination.	Dubuque.	Maquoketa.	Oct. 14, 1886	
2734	Nachtwey, Theo.	April 17, 1884	Graduate	Lansing.			
2761	Nugent, Ed. D.	June 3, 1884	By examination.	Oskaloosa.			Out of business.

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
2917	Newhouse, H E.	Aug. 18, 1885	By examination	Sheffield	Geneva	Mar. 19, 1896	
3188	Norton, Charles F.	Feb. 22, 1887	By examination	Des Moines.			
3209	Nichols, W E.	April 5, 1887	By examination	Sheffield	Eagle Grove	May 4, 1896	
3314	Null, Harry O.	Sept. 6, 1887	By examination	Winterset	Des Moines	Sept. 7, 1891	
3616	Newbold, R. L	Mar. 6, 1889	By examination	Center Point			Out of business.
3721	Nordstrum, S. G.	Sept. 3, 1889	By examination	Dayton	Sioux Rapids	Jan. 10, 1891	
3771	Nix, John M.	Nov. 25, 1889	By examination	Dyersville.	Ackley	Oct. 13, 1891	
3825	Northrup, A. S.	Feb. 10, 1890	By examination	Iowa City.			
3858	Naumann, E L. J.	Feb. 27, 1890	Graduate	Burlington.			
3903	Nordstrum, J. F.	July 1, 1890	By examination	Sioux Rapids	Dayton	May 7, 1895	Out of business.
3904	Newquist, Frederick	July 5, 1890	By examination	Stanton	Essex	Nov. 16, 1891	
3935	Namur, Charles	Sept. 12, 1890	By examination	Des Moines.			
3941	Newbrand, D.	Sept. 30, 1890	By examination	Oskaloosa.			
3950	Nadler, Frank	Oct. 16, 1890	Graduate	Davenport.			
3972	Nelson, J. V.	Jan. 6, 1891	By examination	Winterset			Out of business.
3998	Nauman, W. B.	Mar. 3, 1891	By examination	Waterloo	Charles City	Feb. 9, 1894	
4003	Naiden, H. R.	Mar. 3, 1891	By examination	Woodward.			
4084	Nelson, C. H.	June 26, 1891	By examination	Des Moines			In Wisconsin.
4089	Ney, Robert J.	July 7, 1891	By examination	Independence		Oct. 24, 1893	
4121	Noel, John F	Oct. 6, 1891	By examination	Des Moines	Creston	Sept. 14, 1895	
4344	Nigg, Henry A	Dec. 13, 1892	By examination	Merrill.			
4413	Neilson, John W.	Mar. 8, 1893	By examination	Coggon		Jan. 15, 1894	Concordia, Kan.
4475	Nix, Mike	June 7, 1893	By examination	Ackley	Dyersville	Nov. 3, 1896	
4521	Nichols, C. Ellis	Sept. 22, 1893	By examination	Sioux City.			
4549	Nelson, William	Nov. 28, 1893	By examination	Britt	Corwith	July 18, 1895	
4613	Nelson, Charles N.	Mar. 15, 1894	By examination	Bedford			
4686	Nickson, J D	July 3, 1894	By examination	Humboldt	Forest City	Mar. 24, 1896	
4690	Nirling, Walter A	July 3, 1894	By examination	Sioux City.			
4724	Newman, Charles T.	Sept. 4, 1894	By examination	Marshalltown	St. Anthony	Sept. 4, 1895	
4775	Nichols, C. F.	Nov. 13, 1894	By examination	Panora.			
4817	Nielson, Henry A.	Feb. 5, 1895	By examination	North McGregor.			
4916	Noblett, Roy C.	Aug. 9, 1895	By examination	Cresco.			
4950	Norton, N. S.	Dec. 10, 1895	By examination	Marathon	Fonda	Jan. 5, 1897	
5063	Nolan, G. R	April 21, 1896	By examination	Ruthven	Nora Springs	Jan 4, 1897	
5086	Nicolls, F F.	May 5, 1896	By examination	Danbury	Kingsley	Nov. 5, 1896	
5098	Newman, Orace	June 2, 1896	By examination	Webster City.			
5120	Nordhaus, C. A	Aug. 4, 1896	By examination	Stanwood.			

5158	Nietert, W. G.	Oct. 23, 1896	Graduate	Alburnette.			
116	Ong, F. M.	June 12, 1880	As owner	Wapello.			Out of business.
374	Olney, Arthur R.	June 10, 1880	As owner	Clinton.			
490	Oeder, Frederick	June 12, 1880	As assistant	Des Moines.			
861	Orcutt, G. B.	June 8, 1880	As assistant	Maquoketa.			
951	Olmstead, Earl N.	June 11, 1880	As owner	New Hampton.			
971	O'Connor, J. C.	July 5, 1880	As owner	Melrose.			
1118	Ormiston, J. S.	July 7, 1880	As owner	Chelsea	Hartwick	—— —, 1895	
1264	Otis, Clarence M	June 7, 1880	As assistant	Tabor			Out of business.
1462	Osborne, Benjamin F.	July 15, 1880	As assistant	Rippey.			
1674	Olds, Benjamin R.	July 27, 1880	By examination	Cherokee	Aurelia	Mar. 22, 1882	
1727	Osler, J. W.	Sept. 15, 1880	As assistant	Greene			Out of business.
1939	Oleson, Olaf M.	Dec. 15, 1880	By examination	Fort Dodge.			
1960	Owen, N. Eugene	Oct. 4, 1880	By examination	Oskaloosa			Lathrop, Mo.
2233	Oldridge, W. V.	Oct. 3, 1881	By examination	Farley.			
2391	Olive, Edwin A.	Nov. 28, 1881	By examination	Bayard	Scranton	Jan. 31, 1890	
2396	Owens, A. P.	Dec. 17, 1881	By examination	Alton			Out of business.
2856	Ochiltree, V. B.	April 7, 1885	By examination	Keokuk.			
3027	Owen, C. N	June 15, 1886	By examination	Marion.			
3040	Overholt, F. W	July 6, 1886	By examination	Harlan.			
3107	Olsen, Monrad J	Dec. 17, 1886	By examination	Des Moines.			
3475	Olive, D. C.	June 18, 1888	By examination	Scranton			Out of business.
3486	Odiorne, Ben G.	July 11, 1888	By examination	Des Moines.			
3585	Ogg, John J.	Jan. 29, 1889	By examination	Lime Springs			In Minnesota.
3599	Overfield, E. E.	Feb. 15, 1889	By examination	Elma.			
3837	Ott, John R	Feb. 5, 1890	By examination	Washington	Mt. Pleasant	Mar. 22, 1894	
3906	O'Reilly, William F.	July 12, 1890	Graduate	Keokuk.			
3955	Owen, Luther P.	Nov. 3, 1890	By examination	Marion.			
4039	Osborne, E. A.	Mar. 30, 1891	By examination	Indianola		Feb. 1, 1895	
4222	Olinger, William	Feb. 1, 1892	By examination	Thayer.			
4342	Ostrander, A. P.	Dec. 6, 1892	By examination	Grinnell			In Texas.
4442	Overton, W. T.	May 2, 1893	By examination	Hampton.			
4467	Ormsby, F. E.	June 6, 1893	By examination	Martelle.			
4481	Olney, V. L	July 11, 1893	By examination	Shell Rock	Sheffield	Sept. 26, 1894	
4638	Owens, Frank	July 26, 1892	By examination	Bloomfield			In Missouri.
4646	Owens, Nat	April 4, 1893	By examination	Bloomfield.			
4814	Olive, Richard W.	Feb. 5, 1895	By examination	Scranton	Harcourt	July 26, 1897	
4855	Oehring, Charles C.	Mar. 28, 1894	By examination	Elkader.			
4878	O'Day, J. W.	May 7, 1895	By examination	Danbury.			
4907	O'Brien, Dan. J.	July 16, 1895	By examination	McGregor			In South Dakota.
4913	Ocker, Leroy M.	Aug. 6, 1895	By examination	Toledo	Aplington	Jan. 8, 1897	
4970	Ordway, Cora	Jan. 7, 1896	By examination	Mapleton	Elliott	Sept 20, 1897	
5009	Oelke, W. C	Mar. 3, 1896	By examination	Lenox	Wellman	Feb. 17, 1897	
5054	Olinger, J. B.	April 17, 1896	As graduate	Maxwell	Slater	June 2, 1897	
5060	Oard, A. W.	April 21, 1896	By examination	Fort Dodge.			
5094	Orr, A. L.	June 2, 1896	By examination	Mystic	Eldon	Oct. 24, 1896	
5184	Ordway, J. C.	Jan. 5, 1897	By examination	New Hartford.			
5208	Ortleb, George	May 7, 1897	By examination	Burlington.			

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
8	Playter, John B.	June 3, 1880	As owner	Bristow.			
22	Perrin, Willard	June 2, 1880	As owner	Floyd.			
122	Peters, C. W.	June 15, 1880	As owner	Ft. Madison.			
481	Parker, J. H.	June 22, 1880	As owner	Des Moines.			
627	Pipher, John	June 2, 1880	As owner	Griswold.			
728	Peregrine, C. S.	June 5, 1880	As principal	Brooks.			
823	Plumb, Edwin B.	June 26, 1880	As owner.	McGregor.			
837	Pyle, Samuel M.	June 1, 1880	As assistant	Mt Pleasant.			
838	Peterson, S. J.	June 30, 1880	As owner	McGregor.			
844	Putnam, R. A.	June 9, 1880	As assistant	Monticello.			
962	Parmenter, R. F.	June 5, 1880	As owner	Newton.			
1161	Powers, George P.	July 9, 1880	As assistant	Marshalltown.			
1225	Penn, A. V.	June 10, 1880	As owner	Sidney.			
1236	Parker, William L.	June 2, 1880	As assistant	Sibley.			
1283	Palmer, W. S.	June 2, 1880	As principal	Vinton.			
1290	Pickering, C. E.	June 4, 1880	As owner	West Liberty			Out of business.
1538	Price, J. W.	July 24, 1880	As owner	Burlington.			
1588	Porter, Edwin C.	Aug. 6, 1880	As owner	Dubuque.			
1714	Peregrine, J. S.	Sept. 7, 1880	As owner.	Brooks.			
1847	Powell, L. E.	Nov. 20, 1880	As assistant	Charles City	McIntyre	July 12, 1892	
1868	Plitt, H. A	July 28, 1880	By examination	Wapello.			
1909	Peterson, C. Peter	July 30, 1880	By examination	Des Moines	Stratford	Aug. 13, 1889	
1964	Pelham, W. S.	Jan. 29, 1881	As assistant	Kirkville.			
2156	Pierce, G. R.	June 28, 1881	By examination	Blairstown			In Salem, Iowa.
2247	Pape, Herman G	Oct. 12, 1881	By examination	Davenport			Out of business.
2298	Payne, Annie E.	Dec. 28, 1881	By examination	Richland			Out of business.
2360	Parker, E. W.	Feb. 27, 1882	By examination	Peterson	Sutherland	May 28, 1890	
2415	Patterson, M. F.	April 28, 1882	By examination	Pocahontas Center			Out of business.
2436	Plumb, Weston T.	May 23, 1882	By examination	Van Cleve.			
2521	Powers, C. A.	Sept. 5, 1882	By examination	Moravia	Moulton	Jan. 15, 1888	
2550	Prann, Al. W.	Dec. 1, 1882	By examination	Cresco	Cornell	Mar. 13, 1897	
2562	Parker, S. T.	Mar. 2, 1883	By examination	Manson	Eagle Grove	Nov. 14, 1896	
2568	Pruit, George A.	Mar. 20, 1883	By examination	Blanchard.			
2675	Paxton, J. F.	Sept. 5, 1883	By examination	Harlan.			
2737	Pentzer, J. L.	April 9, 1884	By examination	Muscatine	Williamsburg	Aug. 18, 1896	
2756	Pickett, John H.	May 26, 1884	By examination	Iowa City	Oskaloosa	Jan. 1, 1889	
2836	Pember, H. H.	Feb. 3, 1885	By examination	Spencer	Rock Valley	May 18, 1896	

2869	Pine, P. R.	April 28, 1885	By examination	Tipton.			
2918	Putman, T. L.	Sept. 1, 1885	By examination	Riverton	Shenandoah	Feb. 5, 1893	Out of business.
2940	Pike, Charles C.	Nov. 4, 1885	By examination	Oskaloosa.			
2942	Platt, George M.	Nov. 11, 1885	By examination	Red Oak.			
3026	Paddleford, J. F.	June 15, 1886	By examination	Nora Springs.			
3124	Platt, W. D.	Mar. 1, 1887	By examination	What Cheer.			
3154	Putzier, Henry J.	Feb. 25, 1887	By examination	Ida Grove	Mapleton	May 27, 1887	
3157	Palen, Joseph A.	Feb. 23, 1887	By examination	Dubuque.			
3180	Putman, J. M.	Mar. 18, 1887	By examination	Gladbrook			Out of business.
3257	Paul, B. F.	June 7, 1887	By examination	Paullina	Blairstown	June 2, 1891	
3298	Pfeiffer, H. Jacob	Aug. 17, 1887	By examination	Le Mars	Cedar Falls	Oct. 1, 1893	
3299	Pickney, E. A.	Aug. 17, 1887	By examination	Forest City.			
3335	Porter, George H.	Oct. 17, 1887	By examination	Eldora	Strawberry Point	June 17, 1895	Out of business.
3413	Painter, William	Mar. 6, 1888	By examination	Peru.			
3433	Pfeiffer, Paul M.	Mar. 20, 1888	By examination	Parkersburg			Out of business.
3453	Potter, F. E.	May 1, 1888	By examination	Shambaugh	Corning	Dec. 2, 1891	
3499	Pratt, Arthur E.	Aug. 7, 1888	By examination	Waukon	Waukon	Oct. 20, 1893	
3594	Phillips, Clyde C.	Feb. 7, 1889	By examination	Sloan.			
3626	Phillips, E. M.	Mar. 27, 1889	By examination	West Union.			
3676	Port, Frank W.	June 11, 1889	By examination	Olin	(Olin only).		
3684	Paine, Fred E.	July 3, 1889	By examination	Vail	Paullina	May 18, 1895	
3722	Peek, Samuel E.	Sept. 3, 1889	By examination	Truro.			
3726	Potts, Harry W.	Sept. 4, 1889	By examination	Unionville	Garden Grove	April 21, 1897	
3734	Potter, James M.	Sept. 17, 1889	By examination	Woodward.			
3759	Pinkham, H. C.	Oct. 26, 1889	By examination	Goldfield	Livermore	Mar. 8, 1892	
3866	Patty, C. C.	April 1, 1890	By examination	Carroll.	Fonda	Mar. 1, 1894	
3867	Pfeiffer, G. A.	April 1, 1890	By examination	Cedar Falls	Parkersburg	Oct. 1, 1891	
3885	Perry, Charles H.	April 22, 1890	By examination	Britt	Milford	Mar. 23, 1893	
3914	Peek, Seman Z.	July 25, 1890	By examination	Grinnell			In Colorado.
3934	Pitkin, F. O.	Sept. 11, 1890	By examination	Cedar Rapids.			
3957	Pollins, Charles E.	Nov. 5, 1890	By examination	Cedar Rapids.			
4020	Parsons, Miss E. S.	Mar. 21, 1891	By examination	Adair	Atlantic	Sept. 14, 1891	
4051	Park, L. E.	May 7, 1891	By examination	Tracy.			
4069	Pierson, L. R.	June 2, 1891	By examination	Des Moines			In Michigan.
4071	Phelps, C. W.	June 2, 1891	By examination	Selma	Eldon	Feb. 14, 1894	
4051	Painter, David	June 19, 1891	By examination	Spencer.			
4093	Pfander, C. F.	Aug. 4, 1891	By examination	Ackley.			
4120	Pitts, W. S.	Sept. 30, 1891	By examination	Fredericksburg.			
4151	Parsons, F. H.	Dec. 1, 1891	By examination	Martinsburg	Oakville	May 13, 1897	
4152	Pennington, G. S.	Dec. 1, 1891	By examination	Ottumwa.			
4206	Petersmeyer, William	Feb. 6, 1892	By examination	Odebolt.			
4261	Perkins, Ira A.	July 5, 1892	By examination	Bonaparte	Hillsboro	Dec. 28, 1894	
4279	Peek, Jesse O.	July 26, 1892	By examination	Winterset		Nov. 5, 1895	
4334	Puckett, Joseph B.	Nov. 22, 1892	By examination	Runnells			Out of business.
4345	Pettit, Lewis N.	Dec. 13, 1892	By examination	Des Moines	Dallas Center	Nov. 28, 1895	
4383	Phillips, J. T.	Feb. 15, 1893	By examination	Independence			Out of business.
4384	Parsons, A. H.	Feb. 21, 1893	By examination	Akron	Ireton	Dec. 15, 1894	
4386	Platt, J. H.	Feb. 28, 1893	By examination	Montezuma.			
4491	Pannebaker, J. W.	July 11, 1893	By examination	Coin.			
4508	Parman, E. J.	Sept. 5, 1893	By examination	Cedar Falls	Decorah	Sept. 28, 1893	

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
4512	Parker, C. E.	Sept. 5, 1893	By examination.	Sibley.			
4538	Patterson, Harry O.	Nov. 9, 1893	By examination.	Atlantic.	Des Moines	June 15, 1895	
4602	Power, J. H	Mar. 6, 1894	By examination.	Bloomfield.	Cincinnati	July 25, 1894	
4635	Platt, Thomas B	April 17, 1894	By examination.	Montezuma.	Peterson	Jan. 2, 1895	
4643	Powers, E. A.	April 20, 1894	By examination.	Moulton.	Walnut.	July 1, 1897	
4653	Parsons, Palmer O.	May 1, 1894	By examination.	Odebolt	Marshalltown.	Feb. 2, 1897	
4683	Page, W. P.	June 26, 1894	By examination.	Kingsley.	Alvord.	Oct. 15, 1895	
4691	Parker, E. R.	July 3, 1894	By examination.	Ireton.			
4692	Plock, Fred G.	July 14, 1894	By examination.	Hawarden.			
4698	Polson, Gustav E.	July 9, 1894	By examination.	Wesley	Buffalo Center	June 24, 1896	
4742	Palen, Anton J	Sept. 25, 1894	By examination.	Dubuque.			
4760	Phelps, Oscar W	Oct. 8, 1894	By examination.	Hawarden.			
4824	Parker, Fred J	April 3, 1894	By examination.	Salem	Stanhope.	Nov. 21, 1895	
4852	Persons, A. F	Mar. 28, 1895	By examination.	Goldfield.	Maxwell.	Oct. 21, 1895	
4923	Peo, Evalene	Aug. 6, 1895	By examination.	Hazelton.			
4976	Pond, A. M	Jan. 7, 1896	By examination.	Webster City.			
4993	Perry, T. J.	Feb. 4, 1896	By examination.	Williamsburg	Millersburg.	April 4, 1896	
5049	Preble, C. H	April 7, 1896	By examination	Humboldt.	Pioneer	May 15, 1897	
5082	Petersmyer, E. C	May 5, 1896	By examination.	Odebolt.	Dunlap.	Mar. 30, 1897	
5097	Penney, T. A.	June 2, 1896	By examination.	Logan.			
5135	Page, F. W.	Sept. 1, 1896	By examination.	Wall Lake.			
5217	Prann, W. E.	Mar. 2, 1897	By examination.	Cresco.			
5229	Pohle, E. B	Mar. 9, 1897	By examination.	Dexter.			
5240	Pfeiffer, W. F.	April 6, 1897	By examination.	Cedar Falls.			
5241	Pederson, G. M.	April 6, 1897	By examination.	Harlan.			
5252	Philipp, A. C	April 6, 1897	By examination.	Earlville.			
5253	Peterson, W. J.	April 6, 1897	By examination.	Fairfield.			
1152	Quire, James C.	July 5, 1880	As owner.	Lynnville.	Searsboro	Dec. 23, 1890	
1153	Quire, Charles E.	July 7, 1880	As owner	Lynnville.			
2314	Quinn, Edward	Dec. 19, 1881	By examination.	What Cheer.	....	....	Out of business.
2370	Quigley, Will A.	Mar. 8, 1882	By examination.	Hawarden.			
2531	Quinn, Charles F.	Jan. 20, 1885	By examination.	Cherokee	Meriden.	Aug 12, 1885	
4529	Quay, W. F.	Oct. 3, 1893	By examination.	Storm Lake.			
4950	Qualey, Olaf.	Dec. 3, 1895	By examination.	Ridgeway.			
33	Rust, David	June 4, 1880	As principal.	Whiting.			

118	Reisener, F. O.	June 6, 1880	As owner	West Point.			
123	Rhoads, H. M.	June 7, 1880	As owner	Clarksville.			
165	Rice, U. A.	June 7, 1880	As owner	Commerce	Des Moines	Oct. 17, 1889	
167	Robbins, Willard	June 8, 1880	As owner	Farragut..			
175	Reynolds, A. J.	June 2, 1880	As owner	Agency City.			
182	Rogg, C. W.	June 12, 1880	As owner	Des Moines.			
206	Rolling, John	June 21, 1880	As owner	Bellevue.			
269	Roberts, A. H.	June 4, 1880	As owner	Audubon.			
291	Richter, Adolph H.	June 3, 1880	As owner	Burlington.			
310	Ragsdale, J. S.	June 9, 1880	As owner	Birmingham.			
332	Rawson, Allen A.	June 7, 1880	As owner	Corning.			
427	Randoph, J. W.	June 22, 1880	As owner	Des Moines.			
437	Richmond, J. A.	June 19, 1880	As owner	Dallas Center.			
476	Robinson, J. H.	June 5, 1880	As principal	Davis City.			
477	Ruete, Theo. W.	June 4, 1880	As owner	Dubuque.			
857	Roberts, James	June 5, 1880	As owner	Montezuma	Albia	Feb. 17, 1891	
902	Reichard, D. H.	June 7, 1880	As owner	Mitchellville	Des Moines	May 16, 1893	
1230	Roberts, Benjamin F.	June 4, 1880	As owner	Scranton.			
1238	Reeves, I. C.	June 4, 1880	As owner	Keokuk.			
1295	Ross, William P., Jr.	June 2, 1880	As assistant	Wilton Junction	Tipton	Feb. 13, 1892	
1304	Rodman, A. A.	June 8, 1880	As owner	Washington			Out of business.
1331	Robertson, F. W.	June 5, 1880	As owner	Waterloo			Out of business.
1344	Rippey, Loudon	June 4, 1880	As assistant	Winterset	Audubon	Jan. 31, 1890	
1376	Rhoads, H. B.	July 14, 1880	As owner	Bedford.			
1419	Rice, Charles	July 13, 1880	As assistant	Smithland.			
1420	Rice, Richard C.	July 13, 1880	As owner	Smithland.			
1441	Reimcke, G. A.	July 19, 1880	As assistant	Muscatine.			
1531	Riggs, William K.	July 17, 1880	As owner	Castalla.			
1684	Roberts, Harry	Aug. 4, 1880	By examination	Atlantic	Des Moines	Oct. 1, 1894	
1723	Roos, Julius G.	Sept. 14, 1880	As assistant	Keokuk.			
1873	Rankin, J. B.	Oct. 25, 1880	By examination	Allerton.			
1885	Riepe, A. C. H. E.	Aug 8, 1880	By examination	Davenport.			
1906	Robinson, H. A.	July 30, 1880	By examination	Oxford.			
1997	Reel, Z. T.	Dec. 25, 1880	By examination	Des Moines	Oskaloosa	Nov. 6, 1894	
2002	Rhoades, John	Dec. 28, 1880	By examination	Fayette			In California.
2086	Reel, A. R.	April 6, 1881	By examination	Des Moines	Oskaloosa	May 19, 1897	
2165	Rice, Charles W.	July 11, 1881	By examination	Cantril			In Minnesota.
2299	Ray, H. G.	Dec. 29, 1881	By examination	Clarkesville	Nashua	April 12, 1884	
2336	Richardson, G. A.	Feb. 3, 1882	By examination	Blairstown	Denison	Jan. 31, 1894	
2337	Riley, F. M.	Feb 6, 1882	By examination	Jefferson			Out of business.
2356	Randall, Charles T.	Feb. 24, 1882	By examination	Dunlap.			
2380	Ryan, J. R.	Mar 27, 1882	By examination	Colfax.			
2387	Rockwell, R. B.	April 4, 1882	By examination	Bedford.			
2466	Robertson, J. C.	June 3, 1882	By examination	Dublin	Council Bluffs	Sept. 7, 1887	Out of business.
2533	Robbins, C. A.	Sept. 14, 1882	By examination	Waukon	Coin	Jan. 14, 1892	
2542	Robinson, D. D.	Oct 19, 1882	By examination	Mt. Pleasant	Burlington	April 14, 1883	
2592	Richardson, J. F.	Mar. 20, 1883	By examination	Harper.			
2615	Ritter, John M.	June 12, 1883	By examination	Richmond	Kalona	Oct. 17, 1887	
2701	Richard, Francis	Nov. 20, 1883	By examination	West Point.			
2707	Royce, Charles S.	Dec. 12, 1883	By examination	Oakland	Malvern	Feb. 20, 1895	

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
2735	Robinson, Ed. H	April 1, 1884	By examination	Burlington	Burlington	Feb. 28, 1893	
2741	Regan, Edwin W	April 15, 1884	By examination	Nevinville.			
2798	Reynolds, G. D	Sept. 2, 1884	By examination	Conrad	Rock Valley	Aug. 2, 1893	
2846	Randolph, Frank	Mar. 3, 1885	By examination	Des Moines.			
2849	Rogasch, William A	Mar. 17, 1885	By examination	Manson	Livermore	July 27, 1896	
2876	Rice, John A	May 5, 1885	By examination	Milton.			
2912	Roberts, Mahlon	Aug. 6, 1885	By examination	Pleasant Plain			
2924	Rogan, W. H	Sept. 14, 1885	By examination	Bayard	Council Bluffs	Jan. 9, 1890	
2928	Ruff, Oscar	Oct. 1, 1885	Graduate	Dubuque.			
2951	Ramsey, J. N	Dec. 1, 1885	By examination	Keota	Cedar Rapids	Oct. 3, 1893	Out of business.
3022	Rickel, T. W	June 1, 1886	By examination	Casey			In Nebraska.
3067	Riley, Andrew G	Aug. 20, 1886	By examination	Jefferson			Out of business.
3133	Reynolds, M. M	Feb. 1, 1887	By examination	Panora			Out of business.
3172	Rodearmel, R. H	Mar. 15, 1887	By examination	Jewell	Randall	May 1, 1894	
3224	Reed, C. W	April 20, 1887	By examination	Steamboat Rock	Woodbine	Oct. 19, 1887	
3227	Ryan, James B	Dec. 21, 1887	By examination	Dunlap	Winthrop	July 1, 1887	
3242	Rainsburg, A. P	May 17, 1887	By examination	Brooklyn.			
3243	Roff, H. J	May 17, 1887	By examination	Lyons.			
3256	Roberts, F. J	June 7, 1887	By examination	Ute	Charter Oak	Oct. 10, 1896	
3284	Riggs, J. B	Oct. 1, 1887	By examination	Parkersburg	Dyersville	July 30, 1897	
3288	Ramsey, Robert B	Aug. 2, 1887	By examination	Floris.			
3297	Raymond, William P	Oct. 4, 1887	By examination	Waukon	West Union	Nov. 1, 1895	
3337	Rees, L. B	Oct. 18, 1887	By examination	Des Moines	Hamburg	Nov. 15, 1887	
3348	Riddle, N. D	Nov. 3, 1887	By examination	Atalissa	Prairie City	Dec. 19, 1887	
3532	Rudert, Otto	Sept. 18, 1888	By examination	Davenport			In Illinois
3544	Rogers, Eugene E	Oct. 1, 1888	By examination	Des Moines.			
3566	Rowe, E. E	Dec. 14, 1888	By examination	Early.			
3573	Ridgley, Charles H	Jan. 1, 1889	By examination	Belle Plaine.			
3579	Ross, Charles K	Jan. 14, 1889	By examination	Tipton.			
3593	Robinson, C. E	Feb. 7, 1889	By examination	Sibley	Popejoy	Oct. 21, 1896	
3610	Rogers, R. R	Mar. 1, 1889	By examination	Correctionville	Manning	June 1, 1894	
3691	Richmond, E. C	July 16, 1889	By examination	Riceville.			
3701	Roberts, Samuel	Aug. 6, 1889	By examination	Sioux City	Le Mars	May 6, 1890	
3768	Ruse, B. E.	Nov. 19, 1889	By examination	Humboldt.			
3777	Reininghaus, J. F	Dec. 2, 1889	By examination	Cantril.			
3800	Ryan, Milo	Jan. 18, 1890	By examination	Vail.			
3804	Rouse, C. H	Jan. 24, 1891	By examination	Mt. Pleasant.			

3858	Reed, John D	Feb. 25, 1890	By examination	Woodbine	Portsmouth	Oct. 1, 1896	
3865	Rutledge, George L	April 1, 1890	By examination	Winterset.			
3870	Ream, R	April 1, 1890	By examination	Iowa City	Cedar Rapids	Jan. 15, 1891	
3884	Raffauf, C. A	April 22, 1890	By examination	Independence.			
3908	Roe, Charles P	July 14, 1890	By examination	Grinnell.			
3966	Roberts, William G	Dec. 2, 1890	By examination	Panora.			
3985	Reinert, Caspar	Feb. 3, 1891	By examination	Sigourney	South English.		
3989	Rathburn, D. C	Feb. 11, 1891	By examination	Fayette.			
3999	Rudy, J W	Mar. 3, 1891	By examination	Sioux City.			
4007	Ritz, George	Mar. 7, 1891	By examination	Griswold	Rockwell City	Sept. 15, 1891	
4057	Robinson, A. J	April 7, 1891	By examination	Algona	Britt	May 13, 1891	
4068	Reichard, W. F	June 26, 1891	By examination	Mitchellville	Des Moines	May 13, 1892	
4098	Rogers, U. C	Aug. 4, 1891	By examination	Cushing	Washta	Oct. 5, 1891	
4117	Royden, F. W.	Sept. 1, 1891	By examination	Greeley		——, 1895	
4119	Reynolds, M. H	Sept. 28, 1891	By examination	Keosauqua.			
4163	Richards, Miss L	Jan. 7, 1892	By examination	West Point.			
4181	Ravenscroft, T. E.	Feb. 16, 1892	By examination	Garrison.			
4208	Ruete, Otto M	Mar. 11, 1892	By examination	Dubuque.			
4235	Rogers, J. Emer	May 5, 1892	By examination	Rockwell.			
4239	Roberts, Thomas	May 24, 1892	By examination	Scranton	Churdan	Feb. 2, 1896	
4244	Ralston, S. A	June 7, 1892	By examination	Indianola	Lacona	Feb. 15, 1894	
4259	Readout, Albert	July 1, 1892	By examination	Ferguson	Union	Dec. 28, 1892	
4270	Reynolds, A. L	July 9, 1892	By examination	Ottumwa.			
4323	Robbins, F.	Oct. 25, 1892	By examination	Neola.			
4339	Roberts, Orlen B	Dec. 6, 1892	By examination	New Market.			
4349	Robb, W. M	Dec. 20, 1892	By examination	Plymouth		Dec. 3, 1894	
4367	Raber, A. S	Jan. 31, 1893	By examination	Stuart.			
4394	Rohlf, Edwin L	Mar. 7, 1893	By examination	Lake Park			In Nebraska.
4407	Reed, H. J. C	Mar. 7, 1893	By examination	Diagonal.			
4408	Russell, Charles R	Mar. 7, 1893	Graduate	Ottumwa.			
4445	Rolfes, Herman	May 2, 1893	Graduate	Des Moines	Davenport	May 16, 1894	
4487	Reed, Charles G	July 5, 1893	Graduate	Gladbrook.			
4550	Rehkoph, A. K	Dec. 5, 1893	By examination	Des Moines.			
4578	Ryan, C. D	Feb. 6, 1894	By examination	Tama	Cedar Rapids	July 25, 1894	
4599	Rambo, John H	Mar. 6, 1894	By examination	Greenwood.			
4629	Reed, J. W.	April 5, 1894	By examination	Lime Springs.			
4680	Rainsburg, C. T	June 5, 1894	By examination	Brooklyn.			
4705	Rowland, A. A	Aug. 6, 1894	By examination	Clinton.			
4721	Rigg, J. Roy	Sept. 4, 1894	By examination	Keokuk	Keokuk	July 8, 1895	
4723	Robinson, R. B	Sept. 4, 1894	By examination	Sumner	Westgate	Jan. 26, 1895	
4731	Rawhouser, J. L.	Sept. 4, 1894	By examination	Tipton	Lone Tree	Nov. 24, 1896	
4736	Robertson, Samuel	Sept. 12, 1894	By examination	Columbus Junction.			
4755	Reynolds, John W.	Sept. 5, 1893	By examination	Creston.			
4778	Ross, N. K	Nov. 13, 1894	By examination	Victor.			
4800	Russell, Fred	Jan. 14, 1895	By examination	Lake City.			
4808	Rippey, J. H.	Jan. 22, 1895	By examination	Pierson.			
4819	Rall, George W	June 27, 1893	By examination	Perry	Waterloo	June 12, 1896	
4882	Richey, E. F	May 7, 1895	By examination	Lohrville.			
4891	Roberts, Joseph	May 7, 1895	By examination	Linn Grove.			
4917	Roe, Carl O	Aug. 9, 1895	By examination	Waukon	Sioux City	July 27, 1896	

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
4938	Riddle, C. H	Sept. 10, 1895	By examination	Prairie City.			
4977	Redman, I. D	Jan. 7, 1896	By examination	Henderson	Glenwood	Aug. 6, 1897	
5021	Reinert, Henry	Mar. 3, 1896	By examination	South English	Sigourney	April 14, 1896	
5043	Rouse, C. O	April 7, 1896	By examination	Mt. Pleasant.			
5067	Robbins, T. L	May 5, 1896	By examination	Fairfield.			
5200	Rodamar, Albert	Feb. 2, 1897	By examination	Waterloo.			
5219	Rogatz, George, Jr	Mar. 2, 1897	By examination	Dubuque.			
5220	Roberts, F. H.	Mar. 2, 1897	By examination	Keosauqua.			
5223	Rosemond, W. H	Mar. 2, 1897	By examination	Clear Lake.			
5225	Reynolds, Lillie E	Mar. 9, 1897	By examination	Leon.			
5233	Ruegnitz, Fred	April 5, 1895	By examination	Elkader.			
5251	Roebuck, E. E	April 6, 1897	By examination	Waterloo.			
5269	Royer, J. D	May 5, 1897	By examination	Hampton.			
5271	Romaine, Ernest	May 4, 1897	By examination	Grinnell.			
5272	Richards, W. W	May 4, 1897	By examination	Cedar Rapids.			
87	Sherman, J. M	June 9, 1880	As owner	Paton	Renwick	Jan. 4, 1893	Out of business.
127	Satterthwait, J. W	June 4, 1880	As owner	Mt. Pleasant.			
199	Salmon, M. M	June 11, 1880	As owner	Burlington.			
219	Shancks, F. B	June 16, 1880	As owner	West Mitchell.			
240	Sheetz, A. L	June 14, 1880	As owner	Algona.			
273	Smith, W. H.	June 3, 1880	As owner	Shell Rock.			
275	Skinner, William B	June 10, 1880	As assistant	Anamosa.			
277	Skinner, Mary A	June 10, 1880	As assistant	Anamosa.			
387	Sylvester, W. G	June 3, 1880	As owner	Cherokee			Out of business.
395	Smith, George E	June 2, 1880	As owner	Clarence.			
396	Stiles, Arthur E	June 18, 1880	As owner	Calmar	West Union	July 28, 1894	
447	Schlegel, Gustave	June 8, 1880	As owner	Davenport.			
454	Smith, David S	June 7, 1880	As owner	Dyersville.			
456	Stanley, J. G	June 7, 1880	As owner	Dexter.			
466	Satterlee, Dwight	June 9, 1880	As owner	Dunlap.			
475	Satterlee, E. S	June 3, 1880	As assistant	Dunlap.			
489	Sheffield, R. H	June 24, 1880	As owner	Gifford.			
501	Snyder, O. H	June 3, 1880	As owner	Malvern			In Plattsmouth, [Neb.
513	Springer, James T	June 4, 1880	As owner	Norway.			
536	Sproat, William S	June 10, 1880	As owner	Corydon.			
554	Shipman, E. M	June 21, 1880	As owner	Emerson.			

594	Smith, Horace W.	June 4, 1880	As owner	Garner.			
651	Smale, George.	June 3, 1880	As owner.	Independence.			
680	Strickling, Joseph C	June 3, 1880	As assistant.	Keosauqua.			
731	Shrader, W. E.	June 28, 1880	As owner	Iowa City.			
754	Stephenson, A. C	June 16, 1880	As owner.	East Des Moines			Out of business.
756	Stempel, A. H.	July 1, 1880	As assistant.	Fort Madison.			
764	Snyder, Daniel B.	June 5, 1880	As owner.	Lyons.			
832	Shiley, George P.	June 2, 1880	As owner.	Missouri Valley.			
869	Summers, L. F.	June 7, 1880	As owner	Milton.			
919	Smith, Henry C.	June 22, 1880	As assistant.	Manchester.			
960	Scribner, William H	June 3, 1880	As owner	Newton			Out of business.
961	Skiff, Harvey J.	June 5, 1880	As owner.	Newton.			
968	Scott, John	July 5, 1880	As owner.	Calmar.			
973	Stevens, Delos D.	July 2, 1880	As owner.	La Fayette.			
975	Smith, John R.	July 6, 1880	As owner	Kellogg.			
1014	Summerwill, W. J	June 7, 1880	As owner.	Odebolt.			
1057	Staadt, Anton.	June 9, 1880	As owner.	Postville			
1058	Staadt, Godfrey.	June 9, 1880	As owner.	Postville.			
1084	Sprague, J. F.	June 3, 1880	As owner.	Russell.			
1110	Shafer, J. A.	June 26, 1880	As owner.	Burlington.			
1119	Storie, D. Q.	July 8, 1880	As owner.	Chariton.			
1128	Schroeder, Frederick	June 7, 1880	As assistant.	Des Moines.			
1129	Sandholm, John A.	July 10, 1880	As assistant.	Des Moines.			
1141	Scott, Calvin B.	June 30, 1880	As owner.	Fontanelle.			
1178	Stonebraker, A. G.	June 4, 1880	As owner	Shell Rock.			
1249	Stiger, Stephen.	June 4, 1880	As owner.	Toledo.			
1252	Soleman, Henry.	June 18, 1880	As owner	Tama City.			
1476	Sweet, Homer L.	July 17, 1880	As owner.	Mt. Etna.			
1548	Salmon, Theo	July 30, 1880	As assistant.	Fort Madison.			
1635	Scroggs, J. P.	Aug. 16, 1880	As owner	Lenox.			
1682	Stuart, James D.	July 30, 1880	By examination.	Mondamin.	Council Bluffs.	Nov. 10, 1887	
1685	Souers, Webb.	Aug. 2, 1880	By examination.	Des Moines.			
1712	Schmucker, D. R.	Aug. 30, 1880	As owner	Des Moines.			
1720	Scott, E. M. B.	July 30, 1880	As owner.	Ottumwa.			
1797	Schadt, Conrad.	Aug. 5, 1880	By examination.	Amana.			
1865	Sommerbeck, R.	Sept. 28, 1880	By examination	Cedar Rapids.			
1888	Speers, George W.	July 30, 1880	By examination.	Vinton.			
1893	Stewart, C. M. C.	Aug. 9, 1880	By examination.	Centerville.	Mason City	June 17, 1882	
1933	Scarr, George F.	Nov. 9, 1880	By examination.	Griswold.	Cumberland.	Nov. 28, 1885	
1940	Schafer, George H	Dec. 15, 1880	By examination.	Fort Madison.			
2015	Shaffer, Lewis O.	Mar. 2, 1881	By examination.	Altoona.			
2064	Sperry, Louis B.	Mar. 17, 1881	By examination.	Hamburg.			
2070	Swartz, John L.	Jan. 10, 1881	By examination.	Iowa Falls.			
2127	Schriever.	May 17, 1881	By examination.	Sigourney.	Richland.	Nov. 16, 1882	
2129	Spaulding, S. J	May 23, 1881	By examination.	Milo	Des Moines.		
2140	Selby, J. Milton.	June 28, 1881	By examination.	Carbon.			
2143	Stoll, L. S	May 24, 1881	By examination.	Arcadia.	Sioux Center	June 15, 1896	
2144	Schlumberger, P	May 27, 1881	By examination.	Griswold	Denison	Mar. 22, 1882	
2196	Sampson, J. W.	Aug. 12, 1881	By examination.	Fairfield.	Ottumwa.	April 10, 1886	
2197	Selby, R. W.	Aug. 11, 1881	By examination.	Carbon.	Odebolt.	Nov. 21, 1896	

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
2290	Schenk, G. W.	Sept. 5, 1881	By examination	Burlington	Lyons	Oct, 15, 1891	
2286	Schoel, August	Dec. 3, 1881	By examination	Gladbrook	Sanborn	Mar. 13, 1885	
2302	Swennings, F. J	Dec. 31, 1881	By examination	Fort Dodge	Panama	May 16, 1883	
2381	Sackett, R. W.	Mar. 28, 1882	By examination	Sioux Rapids	Fort Dodge	May 10, 1884	
2385	Smith, Charles E.	April 1, 1882	By examination	Bedford	Correctionville	Nov. 10, 1890	
2419	Stillians, W. A	April 27, 1882	By examination	Clarinda	Villisca	Mar. 28, 1892	
2427	St. John, L E.	May 10, 1882	By examination	Tingley	Shannon City	July 1, 1897	
2431	Shope, Edwin B.	May 22, 1882	By examination	Milo	Des Moines	Aug. 4, 1886	
2434	Stover, Noah W.	May 17, 1882	By examination	Lucas.			
2445	Sansom, J. E.	May 18, 1882	By examination	Anita.			
2457	Sigworth, M. P	May 24, 1882	By examination	Anamosa			Out of business.
2456	Stevens, J. C.	May 23, 1882	By examination	Shenandoah.			
2480	Salts, Andrew J	June 12, 1882	By examination	Corning.			
2504	Stoehr, Gus A.	July 28, 1882	By examination	Elgin.			
2538	Sproul, C. H.	Oct. 10, 1882	By examination	Hamburg	Red Oak	April 6, 1895	
2590	Smith, A. W.	Mar. 20, 1883	By examination	Scranton	Guthrie Center	Aug. 23, 1889	
2591	Smallpage, R. M	Mar. 21, 1883	By examination	Parkersburg	Eagle Grove	May 29, 1888	
2613	Shrader, F. P	April 3, 1883	By examination	Brooklyn.			
2617	Sieg, Henry C.	April 17, 1883	By examination	Marshalltown.			
2638	Surry, William W.	June 5, 1883	By examination	Hedrick	Keokuk	Oct. 30, 1888	
2687	Shrader, J. A	Sept. 12, 1883	By examination	Monroe			Out of business.
2688	Schumacher, H.	Oct. 2, 1883	By examination	Durant.			
2694	Shnell, T J	Nov. 6, 1883	By examination	Lytle City	Parnell	April 21, 1885	
2713	Stover, Emery E	Jan. 15, 1884	By examination	Lucas	Lacelle.	Dec. 5, 1896	
2748	Stewart, William J.	May 14, 1884	By examination	Grimes.			
2750	Stemets, John	May 20, 1884	By examination	Emmetsburg.			
2753	Simcoke, J. L	May 23, 1884	By examination	Redfield	Adel	Nov. 9, 1885	
2774	Sifford, Charles	June 23, 1884	By examination	Wall Lake	Lake View.	Oct. 1, 1890	
2814	Simons, A. C.	Nov. 18, 1884	By examination	Ida Grove			Out of business.
2827	Strong, R. F.	Jan. 6, 1885	By examination	Clinton.			
2839	Stauffer, George M.	Feb. 17, 1885	By examination	Gladbrook			Out of business.
2844	Schmidt, Louis	Mar. 10, 1885	By examination	Des Moines.			
2882	Shelton, Alva H.	May 26, 1885	By examination	Pulaski	Bloomfield	April 13, 1	
2883	Stanton, John H	May 27, 1885	By examination	Chariton.			
2894	Sanders, J. C.	June 18, 1885	By examination	Deep River	(Deep River only)		
2897	Schlegel, Carl E.	July 22, 1885	Graduate	Davenport.			
2898	Stoddard, F. S.	July 7, 1885	By examination	Jesup			Out of business.

2907	Saunders, O. J.	July 31, 1885	By examination	Clare.			
2931	Sampson, S. V.	Sept. 8, 1885	By examination	Ottumwa	Agency City	Dec. 4, 1886	
2969	Stream, Curtis	Feb. 13, 1886	By examination	Des Moines			
2977	Sampson, F. E.	Feb. 2, 1886	By examination	Greenfield	....	....	Out of business.
2988	Sharder, Charles C.	Mar. 4, 1886	By examination	Iowa City.			
2996	Sherman, Emery	Mar. 16, 1886	By examination	Alden	Independence	Mar. 26, 1892	Out of business.
3008	Smith, David F	May 4, 1886	By examination	Wellman	Centerville	Mar. 28, 1891	Out of business.
3014	Somers, John W.	June 15, 1886	By examination	Ida Grove.			
3042	Scherling, Gust.	Aug. 18, 1886	Graduate	Sioux City.			
3044	Sampson, F. W.	Aug. 30, 1886	Graduate	Osage.			
3058	Stevens, W. B.	July 27, 1886	By examination	Sibley.			
3105	Stewart, J H.	Dec. 7, 1886	By examination	Washington.			
3122	Selby, S. D.	Feb. 1, 1887	By examination	Carbon	Odebolt	Dec. 21, 1896	
3125	Stemple, G. L.	Mar. 8, 1887	By examination	Macedonia.			
3137	Slusher, J. M	Feb. 9, 1887	By examination	Hudson.			
3143	Snelson, William	Mar. 1, 1887	By examination	Massena.			
3151	Slater, Willis O.	Mar. 9, 1887	By examination	Marengo	Fairfield	May 1, 1895	
3159	Svacha, Frank	Feb. 25, 1887	By examination	Cedar Rapids	Ely	July 6, 1887	
3175	Scott, James C	Mar. 23, 1887	By examination.	Glidden.			
3189	Smith, A. B	Mar. 21, 1887	By examination.	Des Moines.			
3205	Severa, W. F.	April 4, 1897	By examination.	Cedar Rapids.			
3217	Springer, George L	April 8, 1887	By examination.	Garwin.			
3236	Sturges, Will E	May 3, 1887	By examination.	Carroll.			
3240	Schminke, F. C. H	May 17, 1887	By examination.	Dubuque.	Marion	Sept. 29, 1887	
3252	Schmidt, W. F.	May 31, 1887	By examination.	Sioux City.			
3274	Shaul, Albert J.	July 5, 1887	By examination.	Keswick	Quimby	Nov. 13, 1888	
3296	Smits, Henry	Aug. 16, 1887	By examination.	New Sharon	Oskaloosa	Sept. 28, 1887	
3304	Sedwick, W. L.	Aug. 31, 1887	Graduate	Sioux City.			
3315	Smith, Fred J.	Sept. 8, 1887	By examination.	Alton	....	....	Out of business.
3320	Starr, John W.	Sept. 26, 1887	By examination.	Fairfield	Liberty Center	Mar. 27, 1897	
3353	Stewart, Charles W	Dec. 6, 1887	By examination.	Crawfordsville	Washington	May 26, 1890	
3368	Smith, Abbert E	Jan. 25, 1888	By examination.	Ocheyedan.			
3370	Sturges, N. F.	Jan. 30, 1888	By examination.	Carroll	Clinton	Mar. 15, 1895	
3392	Stewart, David T.	Feb. 21, 1888	By examination.	Hartley.			
3410	Sherbundy, B	Dec. 12, 1887	By examination.	What Cheer	Sac City	Sept. 30, 1893	
3432	Stoll, W. W.	April 3, 1888	By examination.	Arcadia	Sioux Center	June 17, 1896	Out of business.
3436	Sanford, H Clay	April 10, 1888	By examination.	Belle Plaine.			
3442	Schultz, Louis C	April 17, 1888	By examination.	McGregor	....	....	In Washington.
3463	Sandell, C. A.	May 23, 1888	By examination.	Moingona	Boone	Jan. 21, 1890	
3471	Shumway, W	June 5, 1888	By examination.	Brush Creek.			
3484	Strand, O. A.	July 3, 1888	By examination.	Decorah.			
3528	Satterlee, Gale	Sept. 5, 1888	By examination.	Boone	....	....	In Chicago.
3534	Striegel, Bernhard	Sept. 18, 1888	By examination.	Waterloo	Waterloo	April 18, 1889	
3540	Sargent, W. L.	Oct. 4, 1888	By examination.	Ottumwa.			
3553	Snelson, Lulu	Nov. 6, 1888	By examination.	Massena	Ottumwa	Nov. 7, 1895	
3554	Sellers, Frank E.	Nov. 14, 1888	By examination.	Walnut	Council Bluffs	Aug. 15, 1895	
3568	Sturgeon, Q. A.	Dec. 4, 1888	By examination.	Madrid.			
3577	Sheldon, J. B	Jan. 7, 1889	By examination.	Beaman	Havelock	Oct. 18, 1891	
3601	Smith, Albert C.	Feb. 19, 1889	By examination.	Marshalltown	Eagle Grove	Oct. 2, 1894	
3667	Smith, M. E.	May 28, 1889	By examination.	Des Moines	Winterset	Oct. 14, 1891	

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
3682	Selling, Ed. H	June 18, 1889	By examination	Boone.			
3744	Stewart, Mrs. E. A	Oct. 1, 1889	By examination	Grimes.			
3755	Shank, Harry W	Oct. 15, 1889	By examination	Red Oak.			
3761	Shadley, F. W	Oct. 29, 1889	By examination	Des Moines	Webster City	Mar. 16, 1896	
3765	Smallpage, J. B	Nov. 9, 1889	By examination	Eagle Grove.			
3766	Schmidt, H. E	Nov. 19, 1889	Graduate	Keokuk.			
3789	Shea, J. W	Dec. 20, 1889	By examination	Ottumwa	Mason City	Feb. 3, 1896	
3798	Spohr, A. G	Jan. 7, 1890	By examination	Toledo.			
3806	Schuster, H. J	Jan. 28, 1890	By examination	Cherokee.			
3815	Schneider, Otto C	Feb. 31, 1890	By examination	Iowa City			Out of business.
3838	Seeley, Charles A	Feb. 27, 1890	By examination	Vinton	Marshalltown	April 14, 1897	
3869	Skiff, Wm. C	April 1, 1890	By examination	Chester Center.	Storm Lake	Feb. 16, 1891	
3891	Schlichting, E. A	May 8, 1890	By examination	Minden	Griswold	Jan. 1, 1895	
3898	Studley, Wm. J	June 9, 1890	By examination	Dallas Center	Algona	Dec. 20, 1892	
3905	Sheldon, Frank	July 12, 1890	By examination	Des Moines.			
3910	Shaffer, O. W	July 15, 1890	By examination	Adel.	Casey	Feb. 13, 1892	
3927	Smith, Cloid H	Sept. 2, 1890	By examination	Odebolt.			
3929	Stafford, R. H	Sept. 2, 1890	By examination	Sumner.			
3933	Smith, M. R	Sept. 5, 1890	By examination	Conesville	Laurel	Dec. 8, 1890	
3961	Stevens, J. H	Nov. 25, 1890	By examination	Montour.			
3966	Shea, Michael J	Dec. 2, 1890	By examination	Anthon	Cleghorn	Jan. 30, 1895	
3967	Shaffer, W. B	Dec. 2, 1890	By examination	Altoona	Des Moines	June 27, 1895	
3976	Simmers, George T	Jan. 19, 1891	By examination	Ames			Out of business.
3992	Shope, Charles C	Feb. 14, 1891	By examination	Des Moines.			
4008	Smith, William C	Mar. 7, 1891	By examination	Battle Creek	Dunlap	Sept. 15, 1891	
4028	Stone, N. E	April 7, 1891	By examination	Marathon	Swea City	Feb. 9, 1895	
4048	Shumway, Harry	May 5, 1891	By examination	Leon.			
4075	Stroud, J. S	June 9, 1891	By examination	Des Moines.			
4076	Swatman, B. F	June 9, 1891	By examination	Tabor.			
4079	Surface, David U	June 18, 1891	By examination	Castana	Holly Springs	Feb. 21, 1895	
4087	Shinn, Miss M. O	July 7, 1891	By examination	Corning.			
4091	Symington, T. J	Aug. 4, 1891	By examination	Ackley.			
4102	Shaw, William S	Aug. 18, 1891	By examination	Centerville.			
4109	Smith, J. E	Aug. 25, 1891	By examination	Adel	Earlham	April 28, 1893	
4127	Strunk, H. J	Oct. 10, 1891	By examination	Earling.			
4141	Sartori, Anton	Nov. 18, 1891	By examination	Le Mars.			
4153	Samuelson, J. A	Dec. 1, 1891	By examination	Sioux City.			

4161	Shakespear, George	Jan. 5, 1892	By examination	Delta		Aug. 18, 1894	
4162	Stone, Charles F. M	Jan. 5, 1892	By examination	Marshalltown.			
4166	Schafer, R R	Feb. 28, 1892	By examination	Fort Madison.			
4172	Sherman, D. D.	Feb. 2, 1892	By examination	Washington.			
4173	Sigworth, D. B	Feb. 2, 1892	By examination	Anamosa.			
4213	Sherman, M. E.	April 5, 1892	By examination	Rockwell City.			
4418	Swarm, C. P	April 13, 1892	By examination	Oakland.			
4236	Smith, J. C	May 18, 1892	By examination	Woolstock.			
4237	Salmon, G. A	May 14, 1892	By examination	Columbus Junction.			
4247	Seidler, William	June 21, 1892	By examination	Minburn.			
4250	Singer, William A	June 21, 1892	Graduate	Peoria, Ill.			
4262	Shinn, Amos F	July 5, 1892	By examination	Corning			Out of business.
4263	Smith, R. H	July 5, 1892	By examination	Des Moines.			
4267	Sands, F. G	July 5, 1892	By examination	Ainsworth	Thornburg	Aug. 26, 1893	
4280	Sullivan, E. F	Aug. 9, 1892	Graduate	Des Moines	Afton	Mar. 6, 1893	
4293	Boetje, O H	Aug. 19, 1892	By examination	Monticello.			
4300	Sheffer, S. F	Sept. 6, 1892	By examination	Ottumwa	Des Moines.		
4301	Scrimgeour, C. A	Sept. 6, 1892	By examination	Belle Plaine.			
4309	Shambaugh, L. D	Sept. 13, 1892	By examination	Elkport	Alta Vista	Sept. 19, 1895	
4304	Swenson, J H. L	Sept. 20, 1892	Graduate	Mason City	Ottumwa.	July 12, 1893	
4315	Seyfert, H. L	Oct. 4, 1892	By examination	Arcadia	Valley Junction	July 7, 1896	
4331	Stephenson, C. C	Nov. 30, 1892	Graduate	Centerville	Mystic	Jan. 10, 1895	
4343	Sa son, C. H	Dec. 6, 1892	By examination	Dubuque.			
4395	Shaffer, J. F	Jan. 14, 1893	By examination	Casey			
4397	Shannon, E. S.	Jan. 14, 1893	By examination	Bayard	Jamaica	April 10, 1893	
4398	Siewers, A. C	Jan. 16, 1893	Graduate	Decorah	Dubuque	Feb. 14, 1896	
4411	Simons, A. B.	Mar. 19, 1893	By examination	Sidney.			
4417	Swenson, S N	Mar. 8, 1893	By examination	Fonda	Newell.	Aug 24, 1893	
4420	Sho ler, C. E	Mar. 8, 1893	By examination	Shellsburg	Cedar Rapids	April 7, 1893	
4426	Snyder, R B	April 4, 1893	By examination	Keosauqua.			
4437	Stuart, F G	April 11, 1893	By examination	Hancock.			
4446	Swift, Theo. T.	May 2, 1893	By examination	Marshalltown	State Center	Feb. 6, 1896	
4450	Shumaker, C. M	May 5, 1893	Graduate	Manning	Council Bluffs	Mar. 1, 1897	
4457	Swan, A. B.	May 2, 1893	By examination	Walker.			
4460	Schwingel, William	May 30, 1893	By examination	Jolley.			
4464	Sa m, John L	May 31, 1893	Graduate	Dubuque.			
4476	Schultz, Otto W	June 18, 1893	Graduate	Williams	Alden	Dec. 26, 1895	
4514	Shriner, Frank S	Sept. 5, 1893	By examination	Fairfield.			
4518	Shuey, James F.	Sept. 6, 1893	By examination	Jefferson.			
4527	Schroeder Frank	Oct. 3, 1893	By examination	Atlantic	Templeton	May 14, 1896	
4530	Sills, Frank W	Oct. 3, 1893	By examination	Murray.			
4534	Seamans, E. D	Oct. 24, 1893	By examination	Van Horne	Jefferson	Feb. 4, 1896	
4536	Skillicom, W. M.	Oct. 31, 1893	By examination	Glenwood.			
4541	Smale, Herbert T	Nov. 7, 1893	By examination	Kingsley	Sac City	Oct. 24, 1895	
4553	Schrimer, Charles A	Dec. 5, 1893	By examination	Moravia	Sigourney	Nov. 21, 1894	
4554	Sandberg, Lewis A	Dec. 5, 1893	By examination	Stanton.			
4560	Swallow, George	Dec. 19, 1893	By examination	Des Moines	Grafton	Dec. 30, 1896	
4577	Swallum, R. R.	Feb. 6, 1894	By examination	Hubbard.			
4581	Sloan, William C	Feb. 6, 1894	By examination	Waterloo	Masonville	Sept. 6, 1895	
4628	Schaul, A	April 3, 1894	By examination	Le Mars	Alton	Sept. 26, 1894	

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
4639	Sanderson, J. P.	April 3, 1894	By examination	Bloomfield.			
4632	Steva, H. G	April 17, 1894	By examination	Earlville	Delhi	May 15, 1894	
4641	Shreves, George W.	April 24, 1894	By examination	Bevington	St. Charles	Aug. 21, 1894	
4645	Sutter, Jos R.	June 12, 1893	By examination	Burlington.			
4662	Stockwell, C W.	June 5, 1894	By examination	Bancroft	Armstrong	Jan. 2, 1895	
4665	Sargent, Frank L.	June 5, 1894	By examination	Marion.			
4672	Spotts, S. Walter	June 5, 1894	By examination	Le Mars.			
4673	Schoofs, S J.	June 5, 1894	By examination	Remsen.			
4679	Steelsmith, Frank R.	June 5, 1894	By examination	Belle Plaine	Des Moines	June 18, 1895	
4688	Smith, W. E.	July 3, 1894	By examination	Marble Rock.			
4697	Schultz, W. B	July 25, 1894	By examination	Williams			
4717	Smith, Edgar F.	Sept. 4, 1894	By examination	Monticello	Keokuk	Nov. 9, 1895	
4718	Sorensen, P. R.	Sept. 4, 1894	By examination	Lake Mills.			
4737	Smith, W. A.	Sept. 12, 1894	By examination	Garrison	Britt, Hancock, Co.	Mar. 5, 1895	
4741	Snider, W. C.	Sept. 4, 1894	By examination	Meriden	Tama	Mar. 18, 1897	
4756	Stephenson, George E.	Mar. 8, 1893	By examination	Webster	Eddyville	Oct. 2, 1894	
4757	Shuggart, N K	Aug. 24, 1894	By examination	Elberon.			
4784	Smith, Frank N.	Dec. 4, 1894	By examination	Sioux City.			
4789	Salmon, H. M	Dec. 3, 1894	By examination	Fort Madison.			
4792	Stafford, George A.	Dec. 22, 1894	Graduate	West Side	Latimer	Aug. 19, 1895	
4796	Soper, George M	Jan. 1, 1895	By examination	Sioux City.			
4803	Stauffer, William F.	Dec. 12, 1893	By examination	Gladbrook	Oskaloosa	Sept. 14, 1896	
4820	Shores, George A.	Feb. 5, 1895	By examination	Waterloo.			
4826	Shernard, Leslie W. C.	Mar. 5, 1895	By examination	Sac City.			
4827	Spaulding, Joe	Mar. 5, 1895	By examination	Council Bluffs.			
4837	Stanley, William A.	Mar. 7, 1895	By examination	Dexter.			
4838	Stempel, William C.	Mar. 7, 1895	By examination	Fort Madison.			
4840	Skvor, John M.	Mar. 7, 1895	By examination	Cedar Rapids.			
4874	Shuttleworth, Hupert W.	May 7, 1894	By examination	Des Moines	Nevada	Oct. 16, 1895	
4880	Spencer, Harry D.	May 7, 1895	By examination	Rolfe	Sexton	Mar. 18, 1897	
4883	Searight, Frank	May 7, 1895	By examination	Odebolt.			
4906	Smith, Roy B.	Aug. 15, 1895	Graduate	Bradgate.			
4911	Severin, A. L	Aug. 6, 1895	By examination	Eagle Grove	Corwith	May 2, 1896	
4914	Smith, Edw E.	Aug. 6, 1895	By examination	Sioux Rapids.			
4926	Schwartz, W. A.	Aug. 6, 1895	By examination	Waverly.			
4919	Strauss, Carl	Aug. 9, 1895	By examination	Sioux City.			
4944	Steiner, A. J.	Nov. 12, 1895	By examination	Des Moines	Madrid	Jan. 9, 1896	

4949	Sanderson, C. R.	Dec. 3, 1895	By examination	Montrose.		
4957	Sawyer, Eva	Dec. 3, 1895	By examination	Calamus.		
4963	Sanders, C. W	Dec. 17, 1895	By examination	Manley.		
4971	Smith, W. H	Jan. 7, 1896	By examination	Greenfield.		
4973	Spohr, T. E	Jan. 7, 1896	By examination	Mason City	Garner	May 21, 1896
4986	Speedling, Floyd	Feb. 4, 1896	By examination	Britt	Marble Rock	June 10, 1897
4987	Smith, H. M	Feb 4, 1896	By examination	Churdan	Bayard	Nov. 14, 1896
5000	Sorensen, Hans	Feb. 7, 1896	By examination	Marshalltown.		
5001	Shipman, E. D	Feb. 7, 1896	By examination	Wapello.		
5011	Smith, L. B	Mar. 3, 1896	By examination	Gladbrook	Garwin	July 20, 1897
5018	Snoke, J. F	Mar. 11, 1896	Graduate	Prairie City.		
5023	Steely, J. W	Mar. 17, 1896	By examination	Waterloo.	Bristow	Sept. 2, 1896
5031	Smutz, W. A	April 7, 1896	By examination	Hillsboro.		
5046	Swallum, H. U	April 7, 1896	By examination	Hubbard.	Goldfield	May 4, 1896
5065	Shaffner, W. W	April 21, 1896	By examination	Sanborn.		
5075	Steely, J. H	May 5, 1896	By examination	Waterloo.	Eldora	Nov. 14, 1896
5076	Sloan, J. A	May 5, 1896	By examination	Eldon.	Ottumwa	June 25, 1896
5077	Simpson, G. A	May 5, 1896	By examination	Eldon.	Swea City	July 26, 1897
5078	Sornsen, A. J	May 5, 1896	By examination	Decorah.		
5080	Sternberg, Walter	May 5, 1896	By examination	Mitchellville	Des Moines	April 1, 1897
5102	Shuttleworth, E H	July 7, 1896	By examination	Nevada.		
5105	Story, C. F	July 7, 1896	By examination	Stuart.		
5125	Starr, G. A	Aug. 4, 1896	By examination	Eldora.		
5138	Scarr. H. A	Sept. 1, 1896	By examination	Cumberland	Atlantic	Dec. 8, 1896
5145	Snow, Matilda B	Sept. 1, 1896	By examination	Garner.		
5156	Schuster, G W	Oct. 6, 1896	By examination	Cherokee.		
5169	Southwick, M. E	Nov. 10, 1896	By examination	Moville.		
5180	Sarset, W. F	Jan. 7, 1896	By examination	Forest City.		
5184	Snelson, P. B	April 2, 1895	By examination	Massena.		
5194	Shadle, F. S	Feb. 2, 1897	By examination	Pleasantville	Knoxville	Mar. 22, 1897
5197	Smith, G. J	Feb. 2, 1897	By examination	Riceville.		
5192	Shipley, L. U	Feb. 2, 1897	By examination	Sheldon.		
5205	Shields, W M	Feb. 2, 1897	By examination	Afton.		
5218	Saunders, H. A	Mar. 2, 1897	By examination	Swea City.		
5223	Shipley, Henry	Mar. 2, 1897	By examination	Sheldon.		
5244	Stroud, P. E.	April 6, 1897	By examination	Des Moines.		
5245	Smith. A M	April 6, 1897	By examination	Waukon.		
5254	Specht, A. R	April 6, 1897	By examination	McGregor	Wesley	April 30, 1897
5259	Seaton, S. H	April 6, 1897	By examination	Maloy.		
5261	Schulte, J. F.	May 4, 1897	By examination	Victor.		
5262	Shultz, George	May 4, 1897	By examination	Cumberland.		
5278	Shockley, Ned	June 1, 1897	By examination	Randolph.		
5295	Scheu, L. C	July 6, 1897	By examination	Stacyville.		
168	Trullinger, W. B	June 9, 1880	As owner	Faragut.		
227	Thorman, G. F	June 5, 1880	As assistant	Dubuque.		
421	Toebert, W. H	June 4, 1880	As owner	Dubuque.		
498	Trueblood, John	June 4, 1880	As owner	Earlham	Central City	June 17, 1890
625	Teague, Albert E	June 2, 1880	As owner	Greenfield.		
656	Tabor, B. W	June 9, 1880	As owner	Independence.		

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
938	Troy, Samuel S.	June 9, 1880	As owner	Nashua	....	....	Out of business.
1005	Taylor, Charles S.	June 16, 1880	As owner	Ottumwa.			
1279	Toovey, William	June 4, 1880	As owner	Victor.			
1361	Teed, George W.	June 7, 1880	As principal	Webster City.			
1694	Thompson, J. C.	July 30, 1880	By examination	Ottumwa	Redfield	June 17, 1897	
1703	Thoma, Louis	Aug. 2, 1880	By examination	Fairfield.			
1733	Tower, Hannibal	Sept. 17, 1880	As assistant.	Fort Atkinson.			
1783	Treat, Joseph A.	July 30, 1880	By examination	Stuart.			
1851	Thomas, Camp	Sept. 2, 1880	By examination	Fort Madison.			
1836	Tidd, C. H.	Sept. 7, 1880	By examination	Avoca	Mt. Pleasant.		
1867	True, C. E.	Oct. 28, 1880	By examination	Geneva.			
1942	Tiarks, Herman	Sept. 2, 1880	By examination	Monticello.			
2124	Trotter, W. R.	May 17, 1881	By examination	Newton	Valeria	June 14, 1897	
2474	Thompson, E. C.	June 6, 1882	By examination	Marne	....	....	Out of business.
2500	Thompson, C. H.	July 17, 1882	By examination	Le Mars	....	....	In Omaha, Neb.
2518	Thorson, Nels.	July 20, 1882	By examination	Northwood.			
2563	Tyler, Oscar D.	Feb. 22, 1883	By examination	Lenox.			
2656	Turner, L. C. S.	July 8, 1883	By examination	Greencastle	Colfax	Nov. 22, 1884	
2763	Thompson, A. O.	June 17, 1884	By examination	Des Moines	Wapello	Mar. 16, 1893	
2768	Tobey, E. F.	May 26, 1884	By examination	Green Mountain	Des Moines	June 29, 1886	
3268	Thomas, J. C.	June 21, 1887	By examination	Muchakinock	....	Aug. 5, 1897	
3271	Tornblom, A. L.	June 30, 1887	By examination	Boone.			
3297	Thompson, R. K.	Aug. 16, 1887	By examination	Nevada	McCallsburg	April 6, 1897	
3439	Thompson, E. T.	Mar. 20, 1888	By examination	Audubon	Sioux City	Jan. 7, 1889	
3487	Taylor, James F.	July 8, 1888	By examination	Salix.			
3490	Thomas, C. E.	July 17, 1888	By examination	Williamsburg	Harper	April 1, 1891	
3506	Talboy, J. H.	Aug. 21, 1888	By examination	Castana.			
3511	Taylor, L. M.	Aug. 27, 1888	By examination	Fredericksburg.			
3646	Thelander, C. C.	April 18, 1889	By examination	Sioux City.			
3696	Tainter, E. B.	Aug. 3, 1889	By examination	Oelwein	Carroll	Mar. 2, 1897	
3714	Thormann, A. W.	Aug. 20, 1889	By examination	Dubuque.			
3724	Teefey, Daniel	Sept. 3, 1889	By examination	Anthon.			
3945	Tipton, W. L.	Oct. 7, 1890	By examination	Collins	Aurora	Sept. 30, 1896	
3960	Toovey, Fred A.	Jan. 29, 1891	By examination	Victor	Dedham	April 23, 1893	
4088	Traverse, C. C.	July 7, 1891	By examination	Bloomfield.			
4147	Tyler, M. G.	Nov. 28, 1891	By examination	Goldfield.			
4191	Twiford, L. O.	Mar. 1, 1892	By examination	Spirit Lake	Milford	Mar. 8, 1897	

4194	Taylor, Harry E	Mar. 2, 1893	By examination	Creston	Ottumwa	Feb. 4, 1897
4360	Talbott, A. D	Jan. 10, 1893	By examination	Brooklyn	Brooklyn	June 1, 1895
4358	Thomas, Charles J	Jan. 9, 1893	By examination	Des Moines	Cambridge	Aug. 27, 1895
4377	Taylor, C. W	Feb. 2, 1893	By examination	Carroll	Mondamin	May 21, 1895
4381	Thoma, John M	Jan. 31, 1893	By examination	Postville.		
4440	Taylor, Olin R	April 4, 1893	Graduate	Waterloo	Sumner	April 20, 1894
4478	Torrence, J. D	June 7, 1893	By examination	Kamrar.		
4496	Thurlimann, Ed	Aug. 1, 1893	By examination	Carroll.		
4564	Toole, Charles O	Jan. 2, 1894	By examination	Estherville.		
4668	Thompson, Joseph	June 5, 1894	By examination	Sioux City.		
4682	Taylor, James L	June 26, 1894	By examination	Greenfield.		
4711	Tatman, Pearl J	Aug. 9, 1894	By examination	Centerville.		
4747	Thalenhorst, C. E	Oct. 2, 1894	By examination	Burlington	Des Moines	April 18, 1895
4749	Tobey, Charles S	Oct. 2, 1894	By examination	Des Moines	Dubuque	May 11, 1897
4781	Thome, Matt. L.	Dec. 4, 1894	By examination	Dubuque.		
4793	Torgeson, Thomas T	Dec. 27, 1894	By examination	Kensett.		
4795	Trueblood, W. A	Jan. 1, 1895	By examination	Central City.		
4805	Trumbull, Lucius	April 9, 1894	By examination	Adair.		
4906	Talboy, Thomas	July 16, 1895	By examination	Des Moines.		
4956	Tabler, E. F	Oct. 1, 1895	By examination	Colfax.		
4968	Tapper, W. J	Feb. 4, 1896	By examination	Monona	Independence	April 9, 1897
5010	Thurlimann, Leo	Mar. 3, 1896	By examination	Carroll.		
5061	Tiss, G. I	April 21, 1896	By examination	Corwith	Luverne	July 6, 1897
5100	Todd, G. A	June 22, 1896	Graduate	Murray	Marathon	Dec. 30, 1896
5107	Trumbull, Mrs. I. F	July 7, 1896	By examination	Adair.		
5185	Thomas, F. H	Jan. 5, 1897	By examination	Wyoming.		
5186	Ternes, G. W	Jan. 5, 1897	By examination	Dubuque.		
5192	Tisdale, W. H	Jan. 14, 1897	By examination	State Center.		
5201	Teuscher, David	Feb. 2, 1897	By examination	Victor.		
5296	Todd, J. A	July 6, 1897	By examination	Waterloo.		
5297	Thomas, J. J	July 6, 1897	By examination	Whiting.		
5298	Thoma, S. R	July 6, 1897	By examination	Fairfield.		
994	Udell, A. S	June 18, 1880	As owner	Ottumwa.		
3023	Underwood, Poe	June 2, 1886	By examination	Des Moines	Birmingham	Jan. 10, 1896
4616	Ullum, S. A	April 3, 1894	By examination	Vinton.		
4739	Ulber, M.	Sept. 18, 1894	By examination	Dubuque.		
4818	Underwood, William	Feb. 5, 1895	By examination	Elkader	Dexter	June 25, 1897
394	Van Meter, James G	June 4, 1880	As owner	Belle Plaine.		
827	Van Cise, Isaac P	June 3, 1880	As owner	Mount Pleasant.		
977	Vittetoe, Hiram C	July 6, 1880	As principal	Harper.		
1062	Van de Ven, H	June 8, 1880	As principal	Pella	Ottumwa	Jan. 13, 1890
2047	Van Ness, Isaac T	Jan. 17, 1881	By examination	Minden	Neola	Mar. 7, 1891
2323	Van Werden, L	Jan. 27, 1882	By examination	Leon.		
2357	Van Leuven, G. M	Feb. 21, 1882	By examination	Lime Springs.		
2851	Varner, T. H	April 7, 1885	By examination	Angus	Des Moines	April 6, 1897
3391	Vincent, William A	Feb. 21, 1888	By examination	Belle Plaine.		
3574	Vincent, George I	Jan. 2, 1889	Graduate	Sac City	Oskaloosa	Mar. 21, 1890
3592	Van Ausdall, G. M	Feb. 6, 1889	By examination	New London.		

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
3675	Vance, J. E	June 11, 1889	By examination	Scranton	Gowrie	Oct. 30, 1895	
4055	Vauderly, John	May 8, 1891	By examination	Leon	Van Wert	April 15, 1897	
4136	Vail, Ed Morris	Nov. 10, 1891	By examination	Marshalltown.			
4583	Veatch, E. I	Feb. 6, 1894	By examination	Des Moines.			
4812	Van Sickle, Clark	Feb 5, 1895	By examination	Scranton	Collender	Mar. 24, 1896	
4839	Vickers, Will	Mar. 7, 1895	By examination	Oskaloosa	New Sharon	Aug. 12, 1895	
4863	Vosburg, Paul B	April 2, 1894	By examination	Granville.			
5072	Van Delden, Egbert	May 5, 1896	By examination	Clinton.			
5073	Valerius, Matt	May 5, 1896	By examination	Harper.			
5074	Vosmek, J. H	May 5, 1896	By examination	Cedar Rapids.			
5153	Vohs, G. L	Oct 6, 1896	By examination	Renwick	Ottosen	Nov. 14, 1896	
5172	Vogel, H. A	Dec 1, 1896	By examination	Storm Lake.			
5274	Vrooman, F. E	May 15, 1897	Graduate	Des Moines.			
40	Webb, John B	June 4, 1880	As owner	De Witt.			
76	Wagamot, A. R	June 7, 1880	As owner	Fairbank	Webster City	Mar. 28, 1894	
208	Welsh, George H	June 19, 1880	As owner	Boone.			
225	Welton, Hiram	June 7, 1880	As owner	Butlerville.			
257	Wilken, R. D	June 4, 1880	As owner	Atlantic.			
403	Wellman, Z. A	June 4, 1880	As owner	Cherokee.			
404	Wise, C A	June 4, 1880	As owner	Cedar Falls.			
411	Wilson, L. L	June 18, 1880	As owner	Center Point.			
412	Wilson, G. L	June 18, 1880	As assistant.	Center Point.			
415	Walker, S. B	June 23, 1880	As owner	Calamus.			
450	Wunderlich, G. W	June 5, 1880	As assistant.	Dubuque.			
528	Walker, William A	June 28, 1880	As owner	Ainsworth.			
556	Wolfgang, Al. J	June 18, 1880	As assistant.	Emmetsburg.			
565	Williams, Thomas J	June 3, 1880	As owner	Eddyville.			
606	Ward, Joseph A	June 10, 1880	As owner	Gilman.			
607	Ward, William J	June 10, 1880	As owner	Gilman.			
630	Williamson, W. R	June 4, 1880	As owner	Hopkinton.			
632	Worth, Fordyce	June 11, 1880	As owner	Hesper.			
663	Wallace, O. R	June 9, 1880	As owner	Independence.			
675	Woodruff, M. W	June 9, 1880	As owner	Knoxville.			
799	Weiser, Emilius I	June 5, 1880	As owner	Decorah	....	....	Out of business.
811	Weller, William L	June 8, 1880	As owner	Cedar Rapids.			
881	Wood, Annie L	June 8, 1880	As assistant.	McGregor	Des Moines.		

937	Weaver, A. R.	June 30, 1880	As owner	Chapin	Bristow	May 12, 1896	
945	Wilson, O R.	June 7, 1880	As assistant	Northwood	Kensett	Dec. 10, 1895	
979	Ward, C. H	July 6, 1880	As owner	Des Moines.			
980	Ward, Milo W.	June 29, 1880	As owner	Des Moines.			
1047	Willis, Arthur E	June 5, 1880	As assistant	Perry.			
1093	Wilson, James B	June 9, 1880	As assistant	Randolph	Bloomfield	Oct. 7, 1895	
1184	Williams, Ed. B.	June 4, 1880	As assistant	Strawberry Point.			
1241	Webster. J. C.	June 3, 1880	As assistant	Shenandoah.			
1268	Wyman, J. H	June 12, 1880	As assistant	Unionville	Weldon	June 12, 1890	
1338	Wangler, C D.	June 16, 1880	Graduate	Waterloo.			
1339	Wangler, R C.	June 16, 1880	Graduate	Waterloo.			
1372	Witte, John H.	July 16, 1880	As assistant	Burlington.			
1436	Weber, Henry G.	July 16, 1880	As assistant	Atlantic.			
1503	Whetstone, J. H.	July 23. 1880	As owner	Iowa City.			
1595	Wilson, J. H.	Aug. 7, 1880	As owner	New Virginia			
1624	Weeks, A. J.	Aug. 2, 1880	As owner	Correctionville.			
1671	Waltersheidt, C.	July 31, 1880	By examination	Carroll City	Halbur	May 8, 1886	
1683	Wells, Willis C	Aug. 4, 1880	By examination.	Fairfield	Des Moines	Sept. 17, 1887	
1777	Wright, Geo. J	Oct 12, 1880	As owner	Waubeek.			
1857	White, W. P	Sept. 27, 1880	By examination	Volga City.			
1930	Wilson, A. C.	Oct. 28. 1880	By examination	Oelwein.			
1937	Woodbridge, M. L.	Nov. 12, 1880	By examination	Nashua.			
1984	Westbrook, M. K	Dec. 22. 1880	By examination	Lyons.			
2094	Wood, Dexter L.	Feb. 21, 1881	By examination	Strawberry Point	Waterloo	Sept. 1, 1891	
2104	Wood, W. W.	Feb. 8, 1881	By examination	Des Moines.			
2203	Wright, W. M	Sept. 26, 1881	By examination	Keota	Correctionville	Jan. 23, 1893	
2207	Westbrook. C. H	Aug. 30, 1881	By examination	Arcadia	Manilla	Feb. 20, 1895	
2222	Waight, William F	Sept. 26, 1881	By examination	Lenox	Leon	Mar. 12 1897	
2278	Wilson, M G	Nov. 14, 1881	By examination	Oelwein	Estherville	Mar. 24. 1891	
2407	Wilson. Jesse G .	April 14. 1882	By examination	Barnes City			Out of business.
2486	Wentworth. E G.	June 12, 1882	By examination	Centerville	Centerville	Aug 21, 1893	
2606	Webb. Vernon S.	April 17, 1883	By examination	Eldora.	Oelwein	May 6, 1893	
2616	Wheaton, Charles	April 30, 1883	By examination	Davenport			In Illinois.
2647	Ward, Perry.	June 15, 1883	By examination	Waverly	Central City	Sept. 8, 1893	
2666	Wilder, John J.	July 31. 1883	By examination	Early	Kingsley	July 28, 1885	
2693	Will, F. J.	Nov. 5, 1883	By examination	Jewell Junction	Eagle Grove	Dec. 2, 1885	
2746	Wright, L. D.	May 6. 1884	By examination	Knoxville.			
2755	Woibel, Theo	May 6, 1884	By examination	Mt. Pleasant.			
2825	Waldburger, J. C	Jan. 3, 1885	By examination	Lehigh	Fort Dodge	April 25, 1889	
2848	White. Ira.	Mar. 12, 1885	By examination.	Jamaica	Panora.		
2852	Wallace, A. H.	April 7, 1885	By examination	Independence	Independence.	April 7, 1891	
2859	Wilson, J. E.	April 8, 1885	By examination	Ottumwa.			
2879	Wyckoff, Will C.	May 13. 1885	By examination	Rock Rapids.			
2986	Wiley, C R	June 2, 1885	By examination	Marshalltown			Out of business.
2932	Wachtel, Leo C	Oct. 6, 1885	By examination	New Hampton	Elma	Mar. 2, 1887	
2686	Wiley, Frank B.	Mar. 2, 1886	By examination	Marshalltown.			
2991	Wagley, O N.	Mar. 19, 1886	By examination	Newton.			
3000	Wilhelm, Thomas F.	April 29, 1886	By examination	Fort Dodge	Audubon	Mar. 26, 1896	
3018	Waterberry, D. D.	June 25, 1886	Graduate	Fayette.			
3019	Wittmer, Joseph W.	July 9, 1886	Graduate	Dubuque.			

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
3047	Weis, John	Sept. 16, 1886	Graduate	Dubuque			Out of business.
3092	Winchester, E. E	Oct. 19, 1886	By examination	Eldora.			
3102	Walker, F. S	Nov. 23, 1886	By examination	Fayette.			
3134	Williams, J. I	Feb. 15, 1887	By examination	Peterson.			
3140	Wetherell, F. D	Feb. 23, 1887	By examination	Mason City			Out of business.
3142	West, Frank J	Mar. 2, 1887	By examination	Hampton			In Florida.
3150	Wick, Rollin E	Mar. 15, 1887	By examination	New Hartford.			
3168	Whitney, E. F	Mar. 14, 1887	By examination	Des Moines.			
3176	Willis, Frank	Mar. 29, 1887	By examination	Perry.			
3187	Walrod, Mrs. C. J	Mar. 21, 1887	By examination	Lake View	Storm Lake	May 10, 1894	Out of business.
3241	Wills, D. H	May 17, 1887	By examination	Moravia.			
3248	Webb, Charles M	May 17, 1887	By examination	De Witt	Rolfe	Mar. 7, 1889	
3254	Woodman, J. W	June 6, 1887	By examination	Des Moines.			
3262	Walker, John T	June 21, 1887	By examination	Holstein.			
3286	Whaley, Samuel E	Aug. 2, 1887	By examination	What Cheer	Council Bluffs	June 3, 1890	
3326	Wheeler, F. E	Oct 4, 1887	By examination	Conrad.			
3342	Wirth, Cyrillus	Nov. 3, 1887	By examination	Bellevue	Van Horne.		
3371	Wishard, Samuel G	Jan. 23, 1888	By examination	Adair.			
3376	Wirts, Jacob L	Feb. 7, 1888	By examination	Russell.			
3388	Wilson, C. W	Mar. 5, 1888	Graduate	Kingsley.			
3411	Wood, Frank F	Jan. 23, 1888	By examination	Des Moines.			
3433	Whitcock, George E	April 3, 1888	By examination	Newburn	Chariton	Dec. 16, 1890	
3451	Widner, James	May 1, 1888	By examination	Corning			Out of business.
3455	Wiggins, D. L	May 15, 1888	By examination	Coin			In Kansas.
3461	Wheat, Joseph G	May 16, 1888	By examination	Inwood	Mt. Vernon	Mar. 10, 1897	
3488	Wheaton, George R	July 14, 1888	By examination	Grinnell.			
3494	Weiser, E. J	Aug 8, 1888	Graduate	Decorah.			
3506	Wallender, Joseph	Aug. 21, 1888	By examination	West Liberty	Calmar	June 27, 1889	
3523	Warren, B. C	Sept. 4, 1888	By examination	Mt. Ayr.			
3543	Welton, A. B	Oct. 18, 1888	By examination	Wagner	Clarion	Mar. 11, 1896	
3555	White, Fred W	Nov. 19, 1888	By examination	Clermont	West Union	Mar. 9, 1893	
3561	Wasser, Lot E	Nov. 29, 1888	By examination	Sioux City.			
3603	Wiewel, Joseph	Feb. 19, 1889	By examination	Mt Carmel.			
3604	Wright, Frank	Feb. 19, 1889	By examination	Conway.			
3649	Walker, L. M	April 24, 1889	By examination	Afton.			
3650	Wray, J. W	May 3, 1889	By examination	Oskaloosa.			
3665	Williams, J. Cal	May 27, 1889	By examination	What Cheer			Out of business.

3673	Wood, George N.	June 6, 1889	By examination	McGregor.			
3728	Whitfield, Arthur	Sept. 4, 1889	By examination	Calliope	Hawarden	Mar. 10, 1893	
3736	Winfrey, T H.	Sept. 17, 1889	By examination	Cambridge	Runnells	Nov. 11, 1891	
3772	Woodward, H. H	Nov. 26, 1889	By examination	Melbourne	....	....	Out of business.
3796	Weller, R.	Jan. 7, 1890	By examination	Hedrick.			
3820	Wilson, C. L.	Feb. 4, 1890	By examination	Kingsley	Holstein	June 4, 1890	
3832	Waugh, Walter	Feb. 18, 1890	By examination	Milo.			
3835	Way, Bayard C.	Feb. 26, 1890	By examination	Britt.			
3843	Wilson, Lee S.	Mar. 4, 1890	By examination	Ireton	Akron	Mar. 10, 1891	
3848	Wray, Walter L.	Mar. 14, 1890	By examination	Oskaloosa	Nevada	July 5, 1895	
3856	Wilson, Frank D	Mar. 18, 1890	By examination	Keokuk	Bonaparte	Aug. 19, 1896	
3863	Wilson, James B	Mar. 31, 1890	By examination	Marion.			
3892	Wyland, A. O.	Mar. 16, 1890	By examination	Underwood.			
3909	Wise, C. H.	July 15, 1890	By examination	Cedar Falls.			
3940	Waterbury, F. C.	Sept. 29, 1890	By examination	Marion	Carroll	Feb. 17, 1895	
3944	Wheeler, C. H.	Oct. 7, 1890	By examination	Glencoe.			
3946	Weaver, A. J.	Oct. 7, 1890	By examination	Letts.			
3963	Wagner, Oscar F.	Dec. 1, 1890	By examination	Alden.			
3966	Walrath, B. B.	Feb. 4, 1891	By examination	Brush Creek.			
4011	West, William H.	Mar. 7, 1891	By examination	Kellogg	Dallas Center	——— —, 1895	
4014	Weaver, O. A	Mar. 7, 1891	By examination	Le Grande	Marble Rock	June 26, 1894	
4033	Walker, D J.	April 15, 1891	By examination	Fayette	Hawkeye	Sept. 10, 1891	
4049	Williams, Jack	May 5, 1891	By examination	Oskaloosa.			
4056	Williams, A. J.	May 8, 1891	By examination	Odebolt.			
4067	Whaley, James A.	June 2, 1891	By examination	What Cheer.			
4082	Williamson, O. M.	June 25, 1891	By examination	Ladora.			
4130	Wagner, A.	Oct 29, 1891	By examination	Cedar Rapids.			
4170	Winchell, John E.	Feb. 2, 1892	By examination	Malcom	....	Feb. 26, 1894	
4175	Welch, John W.	Feb 6, 1892	By examination	Tipton	Mechanicsville	Nov. 26, 1893	
4214	Walker, John C.	April 5, 1892	By examination	New Market.			
4216	Whitlock, C. E.	April 7, 1892	By examination	Des Moines	Chariton	Jan. 6, 1893	
4230	Weirick, Harry A.	April 12, 1893	By examination	Newton	Colfax	June 30, 1893	
4240	Weber, John H	June 7, 1892	By examination	Cascade.			
4278	Watson, Charles	July 26, 1892	By examination	Vail.			
4283	Wangler, Joseph P.	Aug. 4, 1892	Graduate	Waterloo.			
4297	Whitacre, J. C.	Sept. 6, 1892	By examination	Webster City	Iowa City	Sept. 13, 1893	
4341	Waterbury, M. O.	Dec. 6, 1892	By examination	Jewell Junction	Mason City	Nov. 3, 1895	
4347	Woodard, Will C.	Jan. 3, 1893	By examination	Marshalltown.			
4366	Westbrook, Burr	Jan. 31, 1893	By examination	Newton	Monroe.	May 10, 1895	
4399	Willett, C A.	Mar. 10, 1893	Graduate	Scranton City	Boone	May 5, 1896	
4418	Wheeler, William B.	Mar. 8, 1893	By examination	Council Bluffs.			
4432	Wesner, Fred W.	April 4, 1893	By examination	Council Bluffs.			
4447	Wray, A. M	May 2, 1893	By examination	Bloomfield	Kalona	Mar. 10, 1894	
4468	Wendell, Ed	June 6, 1893	By examination	Smithland.			
4470	Weller, William	June 6, 1893	By examination	Hedrick.			
4507	Woodruff, W. J.	Aug. 31, 1893	By examination	Foster.			
4517	Walker, George L.	Sept. 5, 1893	By examination	Ottumwa.			
4522	Wilson, Dr George W.	Sept. 26, 1893	By examination	Montezuma	....	....	Out of business.
4539	Whelihan, J. Frank	Nov. 8, 1893	Graduate	Cedar Rapids.			
4551	Womeldorf, John M.	Dec. 5, 1893	By examination	Fayette.			

ABSTRACT—CONTINUED.

Number of certificate.	NAME.	DATE OF REGISTRATION.	HOW REGISTERED.	PLACE OF REGISTRATION.	LATEST REPORTED ADDRESS.	DATE OF LAST CHANGE.	REMARKS.
4565	Will, Edw. C	Jan. 2, 1894	By examination.	Marshalltown.			
4566	Wickerham, I. N	Jan. 2, 1894	By examination.	Oskaloosa.			
4567	Walrod, T. S	Dec. 20, 1892	By examination.	DeWitt	Delmar	....	Out of business.
4670	Williams, J. R.	June 5, 1894	By examination.	Larchwood.			
4622	Williams, A. H	April 3, 1894	By examination.	Mt. Pleasant.			
4640	Wilkins, J. S	April 3, 1894	By examination.	New Hampton.			
4656	West, Jesse A.	June 5, 1894	By examination.	Greenfield.			
4661	Williams, Ed. E	June 5, 1894	By examination.	Odebolt.			
4666	Walsh, Count B	June 5, 1894	By examination.	Beacon	Redfield	Jan. 14, 1897	
4689	Wiltz, J. H	July 3, 1894	By examination.	Pomeroy.			
4695	Watts, J F.	July 3, 1894	By examination.	Waterloo.			
4703	Wilson, W. E	Aug. 7, 1894	By examination.	Ruthven.			
4714	Wilhelm, E. S	Sept. 4, 1894	By examination.	Conrad Grove	Livermore	May 13, 1897	
4770	Wise, P. A	Nov. 5, 1894	By examination.	Cedar Falls.			
4774	Warden, Harry E	Nov. 17, 1894	Graduate	Monroe	Bonaparte	May 19, 1897	
4805	Williams, S. H.	Jan. 22, 1895	By examination.	Estherville.			
4821	Westveer, Abraham M.	Feb. 5, 1895	By examination.	Eagle Grove	Lake City	Mar. 23, 1897	
4870	Wismer, Alvin E	Mar. 26, 1895	By examination.	Sheldon	Little Rock	June 2, 1896	
4856	Walrod, Guy L	Mar 26, 1894	By examination	Ft. Dodge	Barnum	Mar. 21, 1897	
4867	Williams, F. A	April 2, 1894	By examination.	Hopkinton.			
4897	Walters, C. M. C.	July 2, 1895	By examination.	Bancroft	Buffalo Center	Oct. 10, 1895	
4924	Weller, A. J.	Aug. 6, 1895	By examination.	Sigourney.			
4930	Wilson, F. M.	Sept 3, 1895	By examination.	Bloomfield.			
4960	Wilson, E. J.	April 3, 1895	By examination.	Ruthven.			
5008	Wright, C. W	Feb. 4, 1896	By examination.	New Hampton	Alexander	Oct. 27, 1897	
5032	Winans, L. P	April 7, 1896	By examination.	Wilton	Nevada	May 20, 1896	
5110	Weirick, C. J	July 7, 1896	By examination.	Colfax.			
5119	Walzenegger, J. G.	Aug. 4, 1896	By examination.	Burlington.			
5136	Wanberg, G. E.	Sept. 1, 1896	By examination.	Baxter.			
5171	Waters, D. J	Dec. 1, 1896	By examination.	Hudson.			
5207	Watters, W. L.	Feb. 2, 1897	By examination.	Atalissa	Wellman	May 27, 1897	
5231	Wangler, C. J	Mar. 16, 1897	By examination.	Waterloo.			
5276	Wahlstrom, J. A	June 1, 1897	By examination.	Fonda	Paton	June 26, 1897	
5277	Wilson, O. M	June 1, 1897	By examination.	Delta.			
855	Young, B. F.	June 4, 1880	As owner	Manson.			
2698	Yockey, C. C.	Nov. 15, 1883	By examination	Danbury	Correctionville	Sept. 21, 1896	

2962	Yocum, A. L	Jan. 19, 1886	By examination	Newburn	Chariton	April 23, 1889	
3395	Young, O. P	Aug. 16, 1887	By examination	Knoxville	Carlisle	Aug. 21, 1893	
4008	Yates, E T	Mar. 8, 1891	By examination	Audubon	Logan	Nov. 11, 1891	
4036	Young, E M.	Mar. 24, 1891	By examination	Beaman	Marshalltown	May 18, 1891	In South Dakota.
4182	Young, Charles O	Feb. 16, 1893	By examination	Maqu keta.			
4767	Young, John	Nov. 7, 1894	By examination.	Sioux City	Hornick	April 20, 1895	
4832	Young, E. M	Mar. 5, 1895	By examination	Shellsburg.			
4858	Yager, Charles W	April 2, 1894	By examination	Calmar.	Aplington	July 2, 1895	
1647	Zeisig, Charles A	Aug. 25, 1880	As owner	Moscow.			
4425	Zeigler, H. L	Mar. 28, 1893	By examination	Eagle Grove.			

LIST OF REGISTERED ASSISTANT PHARMACISTS.

Number of certificate.	NAME.	RESIDENCE.	DATE REGISTERED.
B 47	Weeks, Carl	Des Moines	May 7, 1895.
B 48	Farrand, L. A	Elma	May 7, 1895.
B 52	Christenson, S. A	Sioux Rapids	Aug. 6, 1895.
B 53	Voogd, Dick	Aplington	Aug. 20, 1895.
5048	Cameron, Mabel	Keswick	April 7, 1896.
5099	Rogers, Arthur L	Des Moines	June 2, 1896.
5140	Bjornstad, Otto	Spencer	Sept. 1, 1896.
5146	Duckworth, T. O	Forest City	Sept. 19, 1896.
5193	Shaw, Harry A	Des Moines	Feb. 2, 1897.
5228	Ferrand, Bert E	Sumner	Mar. 9, 1897.
5238	Trumbull, E. J	Union	April 6, 1897.
5239	Twining, E Le Roy	Des Moines	April 6, 1897.
5265	Lohse, Harry W	Rolfe	May 4, 1897.
5273	Hurtt, O O	Cedar Rapids	May 4, 1897.
5281	Maher, Frank	Arcadia	June 1, 1897.

REGISTERED PHARMACISTS BY COUNTIES

ADAIR.

5843	Culverson, F. P	Greenfield
3943	Herbert, Frank	Bridgewater
5206	Harper, James A., Jr	Greenfield
1921	Knapp, C. D	Greenfield
4870	Kingery, J F	Orient
2476	McClintock, J. M	Adair
1140	McDermid, Peter	Fontanelle
2583	Monnett, H. V	Orient
4105	McKelvey, W. O	Greenfield
4046	Leach, John A	Greenfield
1141	Scott, C B	Fontanelle
4682	Taylor, James L	Greenfield
4865	Trumbull, L	Adair
5107	Trumbull, Mrs. L. F	Adair
625	Teague, Albert E	Greenfield
3371	Wishard, S. G.	Adair
4656	West, Jesse A	Greenfield
2741	Regan, E. W	Bridgewater

ADAMS.

498	Booth, A. E	Prescott
2126	Coakley, J. W.	Mt. Ætna
5235	Harris, H. H	Corning
4197	Jones, H. F.	Corning
4751	Jackson, M. E	Carbon
728	Peregrin, C S	Brooks
3453	Potter, F. E	Corning
382	Rawson, A. A	Corning
2480	Salts, A. J	Corning
4262	Shinn, Amos F	Corning

ALLAMAKEE.

1808	Beeman, C. D	Waukon
3428	Bayless, Charles D	Waukon
1060	Douglass, R. N	Postville
3012	Earl, W. C	Waukon
5042	Freisinger, J. F	Lansing
1555	Gilchrest, W. P	Waukon
3713	Hutter, V	New Albin
753	Markley, George H	Lansing
2779	Myers, S. C	Rossville
2734	Nachtwey, Theo	Lansing
3499	Pratt, A. E	Waukon
1057	Stadt, A	Postville
1058	Stadt, G.	Postville
5245	Smith, Arthur M	Waukon
4381	Thoma, John M	Postville

APPANOOSE.

817	Blosser, George W	Moulton
4623	Buck, Charles W	Moulton
4030	Clark, J. W	Centerville
5095	Carr, O. G	Unionville
992	Duffield, G. W	Centerville
5033	Dillon, I. U	Jerome
4404	Duffield, O J	Centerville
4365	Edwards, Bert	Garden Grove
2814	Forsyth, Robert	Jerome
4458	Forsyth, David B	Mystic
4050	Kauffman, Adolph	Centerville
4494	Lamer, William	Centerville
365	McCreary, William M	Centerville
2521	Powers, C. A.	Moulton
4602	Powers, J. H	Cincinnati
4331	Stephenson, C. C	Mystic
2486	Wentworth, E G	Centerville
1268	Wyman, J. H	Weldon
3241	Wills, D. H	Moravia

AUDUBON.

3318	Bisom, Chas. L	Brayton
173	Cloughly, Wm	Audubon
3061	Houghton, Chas. W	Exira
4986	Hamler, W. A	Exira
4912	Mertz, C. Eugene	Gray
269	Roberts, A. H	Audubon
1344	Rippey, L	Audubon

BENTON.

4252	Bille, John	Mt. Auburn
2580	Babcock, F. J	Belle Plaine
1265	Brubaker J. S	Vinton
2531	Bielenberg, John R	Keystone
3161	Brubaker, C. W.	Vinton
4750	Crossman, W. P	Belle Plaine
3096	Capwell, D H	Garrison
4176	Coveny, T. H	Belle Plaine
3291	Dingman, G. W., Jr	Urbana
2918	Elwood, James D	Van Horne
1280	Hopwood, A L	Vinton
4974	Heiden, L. F	Garrison
4844	Kellem, James L	Van Horne
3960	LaGrange, T. G	Vinton
4321	McCorkle, G. E	Shellsburg
295	Nichols, Edw	Belle Plaine
1283	Palmer, W. S	Vinton
3257	Paul, B. F	Blairstown
4181	Ravenscraft, T. E	Garrison
513	Springer, J. T	Norway
1888	Speers, Geo W	Vinton
4301	Scrimgeour, C. A	Belle Plaine
4616	Ullum, S. A	Vinton
294	Van Meter, James G	Belle Plaine
3391	Vincent, Wm. A	Belle Plaine
3342	Wirth, Cyrillus	Van Horne
4832	Young, E. M	Shellsburg

BLACK HAWK.

3656	Blanchaine, H. J	LaPorte City
1405	Cummings, M. L	LaPorte City
4834	Catlin, F. S	LaPorte City
1341	Forry, Wm W	Waterloo
3677	Henderson, J. L	Waterloo
3886	Henderson, C. R.	Waterloo
4720	Henderson, Harry H	Waterloo
4327	Hoagland, Fred T	Cedar Falls
4752	Hoy, Andrew W	Cedar Falls
4576	Hieber, Louis C	Cedar Falls
3932	Joder, A. T.	Hudson
2515	Knapp, James J.	Waterloo
4291	Landgraf, Frank J	Waterloo
4169	McGaheran, Joseph C	LaPorte City
4617	Merner, D. C	Cedar Falls
2751	Mornin, George S	Cedar Falls
5041	Munger, D M.	Waterloo
4717	Maxanti, Henry	Cedar Falls
5204	Magee, Edward W	Dunkerton
5242	Miller, Carl J	Waterloo
5149	McDermott, C. L	Waterloo
419	O'Keefe, Matt J	Waterloo
3298	Pfeiffer, H. Jacob	Cedar Falls
5 40	Pfeiffer, W F	Cedar Falls
520	Rodamar, Albert	Waterloo
3534	Striegle, Bernard	Waterloo
3187	Slusher, J. M	Hudson
4820	Shores, George A	Waterloo
5296	Todd, J A	Waterloo
404	Wise, Chas. A	Cedar Falls
1338	Wangler, C D	Waterloo
1339	Wangler, R. C	Waterloo
4695	Watts, J. F.	Waterloo
5171	Watters, David J	Hudson
5231	Wangler, C J.	Waterloo
2094	Wood, Dexter L	Waterloo
3909	Wise, Clarence H	Cedar Falls
4283	Wangler, Joseph P	Waterloo
4770	Wise, P. A	Cedar Falls

BOONE.

232	Anderson, Alfred A	Boone
3148	Anderson, A. G	Ogden
5210	Barrett, G. N	Boone
3637	Cagwin, Joel E	Boone
889	Dawkins, Benj. M	Mineral Ridge
5123	Dalander, E. P.	Madrid
4537	Elliott, Geo. F	Frazer
1855	Fitzgerald, Maurice	Boone
3053	Farr. H. S	Madrid
2414	Godding, Carl	Madrid
3197	Gardner, A. J	Ogden
4799	Graves, F H	Boone
3103	Gore, Irwin	Pilot Mound
3164	Haerling, H. L	Boone
4849	Hintz, Louis W	Boone
5104	Hamilton, Wm	Boone
2398	Ingersoll, R. B	Boone
4559	Ingersoll, J. B	Madrid
5179	Kunst, Julius	Ogden
915	Mallory, Dwight	Boonsboro
916	Mallory, Adel.	Boonsboro
2458	McMechan, John W	Boone
4531	McMeachan, James	Boone
4923	Peo, Evalene	Boone
3463	Sandell, C. A	Boone
3568	Sturgeon, Q A	Madrid
3682	Seiling, Ed. H	Boone
4944	Steiner, A. J	Madrid
3271	Thornblom, Alfred L	Boone
208	Welch, Geo. H	Boone
4399	Willet, C. A	Boone

BREMER.

1691	Broadie, A. A	Waverly
3703	Broadie, Herbert H	Waverly
4351	Converse, L. E	Waverly
5142	Fish, G H	Plainfield
3097	Guthrie, John M	Tripoli
4649	Gregg, F. W	Janesville
5055	Glasgow, J. M	Plainfield
4486	Guthrie, Fred L	Tripoli
3368	Henry, Arthur B	Waverly
2063	Kauffman, E. J	Waverly
4156	Koeberle, Theo. A	Sumner
5196	Milz, W. F	Janesville
4925	Schwartz, W. Adolph	Waverly
4440	Taylor, Olin R	Sumner
5250	Winner, Max R	Waverly

BUCHANAN.

1896	Bothwell, G. W	Fairbank
3741	Bain, John	Brandon
4894	Cheesbro, Nellie	Jesup
5226	Cooper, Sadie	Quasqueton
4999	Collins, E E	Winthrop
1596	Everett, F J	Fairbank
1967	Everett, F. G	Fairbank
3632	Eaton, Claude L	Lamont
99	Hyde, M J	Brandon
661	Hovey, Horace W	Independence
4081	Hoffman, G. W	Lamont
4327	Hoagland, Fred T	Jesup
1529	Kenyon, T. F	Jesup
3364	Little, Charles	Lamont
1672	McEwen, Charles A	Independence
4047	McDonald, J. E	Rowley
3438	May, John A	Independence
5170	Martin, Dessie	Jesup
4049	Ney, Robert J.	Independence
3227	Ryan, James B	Winthrop
3884	Raffauf, C. A	Independence
651	Smale, George	Independence
6 6	Tabor, A. W.	Independence
3915	Tipton, W L	Aurora
4988	Tapper, W. J	Independence
663	Wallace, C R	Independence
2852	Wallace, Arthur H	Independence

BUENA VISTA.

4139	Burgett, William O	Newell
2265	Cameron, Charles E	Alta
2709	Hadden, David E	Alta
4211	Hackett, C. W	Marathon
4195	Harlen, Oren O	Storm Lake
3674	Horsman, U. O	Storm Lake
1853	Johnson, L M	Storm Lake
4232	Johnson, Henry A	Sioux Rapids
5025	Kuchemann, B. F	Newell
3658	Lundvall, N. A	Sioux Rapids
4620	Larson, Edw	Alta
2368	Niemann, Theo	Newell
3731	Nordstrom, S. G	Sioux Rapids
4529	Quay, W F	Storm Lake
4891	Roberts, James	Linn Grove
4417	Swenson, S. N	Newell
3869	Skiff, William C	Storm Lake
4914	Smith, Edw. E	Sioux Rapids
5100	Todd, George A	Marathon
5172	Vogel, Henry A	Storm Lake

BUTLER.

	Allison	4913	Ocker, Leroy M	Aplington
	Allison	5184	Ordway, John C	New Hartford
W.	Allison	3	Playter, John B.	Bristow
	Greene	3867	Pfeiffer, Gustave	Parkersburg
J	Allison	123	Rhoads, H. M	Clarksville
	Greene	513	Springer, James T	Norway
	Greene	273	Smith W. H	Shell Rock
	Parkersburg	1178	Stonebreaker, A. G.	Shell Rock
	Bristow	5023	Steely, Joel W.	Bristow
	Dumont	927	Weaver, A. R	Bristow
	Parkersburg	3160	Wick, Rollin E.	New Hartford
	Clarksville	4858	Yager, Charles W	Aplington

CALHOUN.

	Lake City	4255	Martin, D. T	Pomeroy
	Farnhamville	4713	Mullarky, H	Manson
	Rockwell City	5174	Martin, P. J	Lake City
	Manson	5071	Moore, C. J	Lohrville
	Jolley	4007	Ritz, George	Rockwell City
	Manson	48'0	Russell, Fred	Lake City
	Manson	4882	Richey, E. F	Lohrville
	Rockwell City	4460	Schwingel, William	Jolley
	Manson	4689	Wiltz, J. H	Pomeroy
	Lake City	4821	Westveer, A. M	Lake City
	Pomeroy	855	Young, B. F	Manson
	Lake City			

CARROLL.

	Coon Rapids	2550	Prann, A. W	Carroll
	Carroll	3610	Rogers, R. R., Jr	Manning
	Arcadia	5269	Royer, John D	Coon Rapids
	Coon Rapids	3175	Scott, James C	Carroll
	Glidden	3236	Sturges, Will E.	Carroll
	Carroll	4527	Schroeder, Frank	Templeton
	Carroll	3980	Toovey, Fred A.	Dedham
	Manning	4496	Thurlimann, Edward	Carroll
	Breda	3698	Tainter, E B	Carroll
	Manning	1671	Watterscheidt, Charles	Halbur
	Breda	3940	Waterbury, F. C	Carroll
	Arcadia			

CASS.

L.	Griswold	4740	Major, C. W	Anita
	Lewis	247	Nichols, William M	Atlantic
	Lewis	272	Nichols, Jonathan	Atlantic
	Lewis	4020	Parsons, Miss E. S.	Atlantic
	Atlantic	627	Pipher, John	Griswold
	Massena	1933	Scarr, George F.	Cumberland
	Atlantic	3143	Snelson, William	Massena
	Wiota	3891	Schlicting, E A.	Griswold
	Atlantic	5138	Scarr, Henry A.	Atlantic
	Atlantic	5181	Snelson, P. B	Massena
	Cumberland	5262	Schultz, George	Cumberland
	Anita	1436	Weber, Henry G	Atlantic
	Anita	257	Wilkin, R. D.	Atlantic
	Marne			

CEDAR.

	Durant	1193	Mather, Charles E.	Springdale
	Clarence	3571	Morgan, James W.	Tipton
	Tipton	4934	McGrew, Edw. S.	Tipton
	West Branch	5120	Nordhaus, C. A	Stanwood
	Mechanicsville	2369	Pine, P. R	Tipton
	West Branch	3579	Ross, Charles K	Tipton
	Mechanicsville	1295	Ross, William P., Jr.	Tipton
	Tipton	395	Smith, George E.	Clarence
	Tipton	2688	Schumacher, H.	Durant
	Lawler	2445	Sansom, J. E.	Bennett
	Springdale	4175	Welch, John W	Mechanicsville

CERRO GORDO.

3332	Adams, J. W	Mason City
3902	Allen, E. D	Thornton
4208	Adams, Henry B	Mason City
2187	Burns, Edw. M	Mason City
3059	Bass, Leo. F	Clear Lake
4031	Blaise, T. T	Mason City
4319	Bowen, R. F	Mason City
4393	Brooks, W. W	Clear Lake
4414	Bauman, Robert	Meservey
5045	Ballentine, W. A	Mason City
4209	Cappock, William	Mason City
4678	Dixon, John S	Mason City
320	Eitzel, John L	
3640	Howland, G. W	
4223	Hughes, Charles W	
5129	Hintzen, H. F	
4359	Mulligan, William H	
3593	Robinson, C. E	
5223	Rosemond, W. H	
4349	Robb, W. M	
1893	Stewart, C. M. C	
3789	Shea, J. W	
4341	Waterbury, M. C	

CHEROKEE.

3302	Bechman, Otto C	Cherokee
3597	Blair, C. A	Cherokee
4860	Bundy, Edgar A	Larrabee
4462	Fry, Wm. N.	Marcus
3305	Georges, Amandus G	Marcus
5299	Gerlach, Richard	Cherokee
4092	Rogers, U. C	
3274	Shaul, A. J	
3308	Schuster, H. J.	
5156	Schuster, Geo. W	
3966	Shea, Michael J	

CHICKASAW.

3634	Blinn, S. W	Nashua
3311	Gardner, H. W	New Hampton
2676	Landon, C. M.	Lawler
3258	Landon, Judd E	Lawler
3720	Moody, Clark B	Ionia
5211	Malloy, John E	New Hampton
951	Olmsted, E. N	New Hampton
4121	Pitts, W. S	Fr
2299	Ray, H. G	
4917	Roe, Carl C	
4309	Shambaugh, L. D	
3511	Taylor, L M	Fr
1937	Woodbridge, M. L	
4640	Wilkins, J. S	N

CLARKE.

3773	Bollbaugh, W. R	Osceola
3987	Carver, W. F	Murray
810	Garretson, B. F	Osceola
848	Grigg, Robt. C	Murray
5284	Grigg, M. F.	Murray
4430	Hursh, Will T	Osceola
2641	Lawrence, Edw	Osceola
2901	Lawrence, Harry	
3194	Landis, Jesse E	
3836	London, L. W	
4853	Lauder, James A	
2133	Martin, M. T	
2892	Miller, T. L.	
4530	Sells, Frank W	

CLAY.

3693	Bender, Geo. B	Spencer
3733	Cottrel, Geo. B	Spencer
3783	Cobb, Edw. T	Dickens
4185	Carmichael, C. C	Everly
5066	Carmichael, Lola	Everly
4557	Cooper, Geo. E	
3011	Dickey, E. L	
4245	Matthews, F. A	
4635	Platt, Thos. B	
3134	Williams, J. I	

CLAYTON.

547	Bayless, Frank B	Elkader
1558	Blanchard, Lewis	Edgewood
1557	Bixby, Ransom J	Edgewood
4024	Becker, Wm.	Elkader
4251	Bliss, Geo. W	McGregor
5079	Barnes, Lloyd M	Strawberry Point
4288	Fox, Harry C	Monona
3760	Graham, Robert D	Monona
4833	Green, S. E	Osage
548	Hagensick, H. H	Elkader
2496	Hoag, E H	Strawberry Point
3190	Heine, W. H	Sexton
4284	Henry, J. W	Strawberry Point
5214	Henry, A. L	
903	Kennedy, M. G	
2167	Kuenzel, H. C	
3145	Kriebs, Geo	
3763	Kramer, Chas. F	
1994	Newman, M. M	
4817	Nielson, Henry A	Nor
4855	Oehring, Chas. C	
838	Peterson, Sam'l J	
5233	Ruegnitz, Fred	
1184	Williams, E B	Stra
1857	White, W. P	
3673	Wood, Geo. N	

CLINTON.

2662	Adams, John R	Lyons
3346	Bacon, George	Clinton
5188	Beard, Abner R	DeWitt
5257	Bigelow, Zella	Lost Nation
3434	Cunningham, T. C	Clinton
4042	Cozine, Wm. E.	Clinton
4416	Cozine, Irwin V	Clinton
4728	Cleasby, A. B	Clinton
4265	Doehner, W. F	Wheatland
4630	Evans, J. W	Clinton
1330	Gamble, Thos. D.	Wheatland
5068	Hageboeck, Wm H	Lyons
352	Houston, Geo. W	Clinton
2417	Houston, Jas. T	Clinton
3756	Hunt, Homer	
3828	Harrington, J. D	
3815	Hill, C E	
4204	Henning, Wm. E	
4654	Holmes, Eva R	
5213	Hartman, Chas. P	
2722	John, Milo J	
3323	Killheffer, J. S	
3545	Kent, Chas. F.	
1701	Langheim, J. M.	
5132	Ludolph, Henry W	
188	McKenzie, H. M	
189	McKenzie, Emma M	
363	Majer, Oscar	

CLINTON—CONTINUED.

2138	McLain, Geo.	Clinton
4180	Moffett, Ben. F	Clinton
4452	McMeel, E. C	Delmar
4660	McMeel, J. H	Lost Nation
5176	Manion, P. H	Charlotte
374	Olney, Arthur R	Clinton
3243	Roff, H. J	Lyons
764	Snyder, Dan'l B	Lyons
2230	Schenk, Geo. W	Lyons
3370	Sturgis, N. F	Clinton
4957	Sawyer, Eva	Calamus
5072	Van Delden, Egbert	Clinton
40	Webb, John R	DeWitt
415	Walker, S. B	Calamus
1834	Westbrook, W. H	Lyons

CRAWFORD.

3281	Burk, Jas F	Denison
3971	Bowney, A. F	Buck Grove
4675	Cassady, Leon M	Denison
5285	Davis, Geo. H	Dow City
1781	Evans, Warren B	Arion
5275	Eigler, Frank H	Denison
2455	Gardner, J. B	Manilla
4584	Hart, W. E	West Side
1798	Knaul, Rudolph	Denison
2987	Kniest, F. V	Charter Oak
3697	Kinyon, L. W	Vail
3916	Lies, Michael E	Denison
4242	McGarvey, S. B	West Side
3249	McWilliams, J. J	Charter Oak
2336	Richardson, Geo. B	Denison
3256	Roberts, F. J	Charter Oak
3800	Ryan, Milo	Vail
2144	Schlumberger, P. A	Denison
2207	Westbrook, C. H	Manilla

DALLAS.

1638	Brookings, D. J	Woodward
4940	Bundy, J. A	Waukee
3588	Diddy, Claude A	Redfield
3990	Douglas, S. A	Adel
5018	Dooley, E. P	Perry
4045	Forsyth, James C	Redfield
4868	Franks, W. N	Perry
4081	Gardner, George H	Perry
1478	Houghton, F. E	Adel
3501	Loughlin, M. R	Perry
160	Long, G. P	Perry
5282	Lane, Frank L	Perry
3414	Morgan, F. S	Perry
4085	Mallory, J. A	Linden
4006	Naiden, H. R	Woodward
3734	Patter, James M	Woodward
4345	Pettit, L. M	Dallas Center
5229	Pohle, Edwin B	Dexter
487	Richmond, J. A	Dallas Center
4818	Underwood, William	Dexter
456	Stanley, J. G	Dexter
2753	Simcoke, J. L	Adel
4247	Seidler, William	Minburn
4837	Stanley, Will A	Dexter
1694	Thompson, John C	Redfield
1047	Willis, Arthur E	Perry
3186	Willis, Frank	Perry
4666	Walsh, Count B	Redfield

DAVIS.

4281	Beauchamp, Charles E	Bloomfield
3814	Cronk, Charles H	Bloomfield
4929	Davis, C. R	Bloomfield
77	Dunlavy, James	Stiles
301	Gibbons, A. D	Bloomfield
4621	Garrett, J. N	Troy
4761	Guernsey, J. J	Bloomfield
1510	Halstead, Tim. J	Savannah
5029	Kinsinger, Ed. D	Bloomfield
300	McAchran, W. H	Bloomfield
4277	Matthews, Charles W	Pulaski
3288	Ramsey, R. B	Floris
1092	Wilson, James B	Bloomfield
4930	Wilson, F. M	Bloomfield

DECATUR.

2241	Alexander, W. A	Leon
4231	Armstrong, Ernest L	Grand River
4187	Bear, Winfield S	Decatur City
4269	Barrows, C. H	Lamoni
5164	Carter, James H	Leon
2243	De Kalb, Benjamin D	De Kalb
4285	Graves, Fred A	Garden Grove
3431	Horner, T. E	Leon
4026	Honnold, F. J	Leon
2130	Layton, H. R	Leon
2530	Laney, W. J	Davis City
2269	Mitchell, Enos	Weldon
2927	Myers, W. E	Lamoni
4068	Mitchell, Mrs. E. H	Weldon
3726	Potts, Harry W	Garden Grove
476	Robinson, J. H	Davis City
5225	Reynolds, Lillie E	Leon
4088	Shumway, Harry	Leon
2323	Van Werden, Lewis	Leon
4055	Vanderley, John	Van Wert
1268	Wyman, J. H	Weldon
407	Woodbury, George	Garden Grove
2222	Waight, William F	Leon

DELAWARE.

891	Atwater, Frank J	Manchester
3036	Anders, F. W	Earlville
4719	Abbott, W. A	Manchester
4943	Armstrong, T. B	Greeley
713	Bush, John V	Colesburg
4968	Bowman, Ralph H	Delhi
4984	Bush, John A	Colesburg
2304	Conger, E. J	Manchester
5096	Conger, H. G	Manchester
4794	Donnelly, William	Ryan
4823	Denton, Robert A	Masonville
4868	Gibbons, A. S	Ryan
5051	Grems, B. W	Ryan
7	Lont, C. B	Delaware
720	Livingston, Hugh	Hopkinton
5252	Philipp, A. C	Earlville
919	Smith, Henry C	Manchester
4581	Sloan, W. C	Masonville
4632	Steva, H. G	Delhi
630	Williamson, W. R	Hopkinton
4867	Williams, F. A	Hopkinton

DES MOINES.

5002	Bartlett, W. S	Burlington
950	Churchill, Frank	Burlington
3602	Coxe, John C	Burlington
3974	Cochran, W. L	Burlington
4652	Duncan, O. F	Burlington
3770	Fish, H. T	Burlington
1539	Henry, George C	Burlington
3498	Hamler, E. C.	Burlington
4066	Happman, John H	Burlington
4573	Held, Wm	Burlington
2368	Kenyon, W. C	Burlington
5166	Kaiser, W. O	Burlington
4471	Larson, Charles O	Burlington
5368	Melzian, H. F	Burlington
3367	Jordan, Howard M	
4552	June, H. T	
1112	Niehaus, E. W	
3558	Nauman, Emil L. J	
5208	Ortleb, George	
1532	Price, J. W	
2642	Robinson, David D	
2735	Robinson, Edgar H	
199	Salmon, M. M	
1110	Shafer, J. A.	
4645	Sutter, Joseph R	
1372	Witte, John H	
5119	Waizenegger, John G	

DICKINSON.

759	Brownell, E. L	Spirit Lake
5106	Benthall, Eugene	Lake Park
4769	Dexheimer, W. F	Spirit Lake
4811	Errickson, N. L	Milford
1045	Farnham, Leroy H	Spirit Lake
4350	Higbee, U. B	Lake Park
3559	Ingvolstad, O. O	
4655	Johnson, Franklin	
2060	Masters, S. H	
3885	Perry, Charles H	
4101	Twiford, Linton O	

DUBUQUE.

1134	Allen, W. P	Dubuque
1175	Brown, W. K	Dubuque
——	Brown, Charles J.	Dubuque
4385	Becker, John G	Dubuque
4804	Bruckner, Edw	Dyersville
1518	Coy, James W	Dubuque
3639	Dennert, Frank	Dubuque
480	Fraatz, Fred C	Dubuque
4478	Grimm, Adolph G	Dubuque
4980	Glynn, T. H	Cascade
61	Harwood, George	Epworth
422	Hervey, James	Dubuque
479	Haas, Julius W	Dubuque
4060	Haas, Daniel J	Dubuque
4502	Hedley, John E.	Dubuque
226	LaNica, Mart J. G	Dubuque
536	Livermore, Charles A	Cascade
3454	Liek, Charles W	Dubuque
4782	Liek, William C	Dubuque
4952	Lenz, Joseph A	Dubuque
4475	Nix, Mike	Dyersville
2233	Oldridge, W. V	
1588	Porter, Edwin C	
3157	Palen, Jas. A	
4781	Palen, Anton J	
477	Ruete, Theo. W	
3284	Riggs, John A	
5219	Rogatz, George, Jr	
454	Smith, David E	
4342	Samson, Clinton H	
4398	Siewers, A. C	
4464	Sahm, John L.	
227	Thorman, G. F	
421	Torbert, W. H	
4749	Tobey, Charles S	
4781	Thome, Matt L	
5186	Ternes, George W	
4789	Ulber, M	
450	Wunderlich, George W	
3019	Wittmer, Joseph W	
4930	Weber, John H	

EMMET.

4884	Amundson, O. C	Estherville
955	Birney, C. S	Estherville
4479	Burrett, Alva W	Armstrong
3083	Colvin, A. W	Armstrong
3199	Klopp, J. J	Estherville
5168	Myhre, O. G	
4662	Stockwell, C. W	
4564	Toole, Charles O	
2278	Wilson, M. G	
4805	Williams, S. H	

FAYETTE.

72	Burnside, J. M	Waucoma
4589	Bigley, Louis E	West Union
4098	Crow, Will	Clermont
5178	Collins, A. R	Oelwein
2862	Douglas, C. W	West Union
3811	Doan, Frank L	Waucoma
555	Finke, Walter H	Elgin
3152	Fisher, Lewis A	Hawkeye
12	Hubbard, Charles A	Waucoma
2643	Hanes, George W.	Maynard
1013	Jamison, George W	Oelwein
4323	Jones, W.	Wadena
4905	Kidd, Fred. J	Oelwein
4443	McMartin, Chester S	West Union
4518	Macomber, G. B	Maynard
4596	Mettlin, A. J	
3327	Raymond, W. P	
3989	Rathburn, D. C	
4723	Robinson, R. B	
396	Stiles, Arthur E	
2504	Stoehr, Gus A	
3471	Shumway, W	
2606	Webb, Vernon S	
1930	Wilson, Archie C	
3018	Waterbury, Day D	
3102	Walker, F. S	
3555	White, Fred. W	
3986	Walrath, B B	
4033	Walker, D. S	

FLOYD.

1143	Birney, Lewis	Nora Springs
4676	Birney, Emma	Nora Springs
4527	Brincken, Anton	Rockford
5177	Bartz, Ed N	Rockford
4882	DeSmith, C. F	Charles City
5126	DeMoray, Chas. H	Charles City
3643	Dodd, Archie B	Charles City
4073	Grimm, A. L	Rockford
4776	Lamberson, W. B	Nora Springs
2631	Legal, John G	Charles City
2128	Miles, Henry F	Charles City
1124	Miles, Wilbur F	Charles City
4511	May, B. Wood	Charles City
4609	Miles, Clarence W	Charles City
3094	May, Geo. E	Charles City
4903	Murray, Mame E	Rudd
5189	McCray, Walter R	Marble Rock
3998	Nauman, W. B	Charles City
5062	Nolan, Geo. R	Nora Springs
3026	Paddleford, J. F	Nora Springs
4668	Smith, W. C.	Marble Rock
4986	Speedling, Floyd	Marble Rock
4014	Weaver, O. A	Marble Rock

FRANKLIN.

3311	Aborn, F. I	Sheffield
5209	Aborn, Fred C	Sheffield
629	Baldwin, Emmel V	Hampton
3251	Funk, Edgar M	Hampton
4274	Gressler, F. J	Chapin
4709	Gregory, F. W	Geneva
3679	Harriman, O. B	Hampton
4782	Harriman, J E	Hampton
4604	Kent, C. W	Hampton
4748	Lambert, Geo. H	Hampton
2917	Newhouse, H. E	Sheffield
4442	Overton, Walter T	Hampton
4485	Olney, V. L	Geneva
4792	Stafford, Geo. A	Latimer
1936	Tidd, C. H	Geneva
5003	Wright, Carey W	Alexander
5026	Wunderlich, Frank H	Latimer

FREMONT.

4882	Boyer, W. M	Hamburg
4524	Biddinger, L. H	Randolph
3431	Cavender, B. I	Randolph
3613	Cole, Jas. H	Thurman
3750	Doyle, C. E	Hamburg
1722	Harris, T. C	Bartlett
4657	Halbert, M. M	Imogene
4807	Harris, Lewis C	Thurman
508	Keeler, Riley	Sydney
4753	Kidd, Mrs. Emma F	Riverton
638	Mann, Jas	Hamburg
3234	McLain, C	Randolph
4340	Mewhor, J. C	Riverton
1264	Otis, Clarence M	Tabor
1225	Penn, A. V	Sidney
167	Robbins, W. H	Farragut
4676	Swatman, Benj. F	Tabor
4411	Simons, Arthur B	Sidney
5278	Shockley, Ned	Randolph
168	Trullinger, W. B	Farragut

GREENE.

616	Crow, Wm. M	Grand Junction
4681	Crow, Raymond E	Grand Junction
671	Foy, E. W	Jefferson
1508	Freeman, Edw	Jefferson
3535	Foster, F. E	Scranton
5195	Gluther, John S	Scranton
3996	Kirby, S. C	Grand Junction
4396	Lowery, O. W	Grand Junction
4434	Latta, K. C	Paton
4497	Miller, Geo	Churdan
1462	Osborne, Ben. F	Rippey
2291	Olive, Edw. A	Scranton
4239	Roberts, Thomas	Scranton
4518	Shuey, Jas. F.	Jefferson
4534	Seamans, E. D	Jefferson
5276	Wahlstrom, J. A	Paton

GRUNDY.

912	Bowman, Jas. K	Conrad Grove
2350	Ellis, Geo. F	Grundy Center
2904	Hummel, Mathias	Grundy Center
5151	Hummel, Jos. F	Grundy Center
1088	Junger, Hugo	Reinbeck
4296	Ladage, Henry W	Grundy Center
963	Ladage, Wm. C	Grundy Center
3809	Miller, Hawley D	Beaman
3365	Mullarkey, W. G	Holland
5155	Mullarkey, E. E	Holland
3510	Meyers, Edw. G	Reinbeck
3930	Meisner, Ernest	Reinbeck
3326	Wheeler, F. E	Conrad

GUTHRIE.

2605	Adair, Chas. R	Yale
4945	Burrichter, Wm. C	Panora
4422	Crabbe, A. M	Menlo
5260	Cook, Blanch	Casey
3314	Dosh, Ed	Guthrie Center
3631	Doudna, Chas. B	Bayard
4890	Douglas, Ross	Stuart
3106	Funk, Samuel G	Yale
1574	Given, Oliver E	Stuart
1781	Herriott, John	Stuart
4294	Harrison, J. W	Guthrie Center
5053	Haag, Arthur M	Stuart
3233	Lakin, A. M	Yale
3306	Lemon, A. D	Guthrie Center
867	Maulsby, Ellis	Casey
3207	Machesney, W. T	Bagley
3969	Mendenhall, J. R	Menlo
373	North, Henry	Casey
4775	Nichols, C. F	Panora
3965	Roberts, Wm. G	Panora
2590	Smith, A. W	Guthrie Center
3010	Shaffer, O. W	Casey
4395	Shaffer, J. F	Casey
4897	Shannon, E. S	Jamaica
5105	Story, Chas F	Stuart
4987	Smith, Harry M	Bayard
1783	Treat, James A	Stuart

HANCOCK.

4533	Amsden, W. C	Garner
4374	Borman, W. H	Garner
1142	Birney, Catharine	Garner
3723	Collins, Mrs. Carrie S	Garner
4499	Carton, John A	Britt
5083	Goodenow, Norman H	Goodell
4143	Harr, John L	Klemme
3551	Joselyn, Edw. S	Bancroft
4549	Nelson, Wm	Corwith
5009	Oelke, W. C	Corwith
4027	Robinson, A. J	Britt
594	Smith, Horace W	Garner
4911	Sevein, A. L	Corwith
4972	Spohr, Thos. E	Garner
4737	Smith, W. A	Britt
5145	Snow, Matilda B	Garner
3835	Wray, Bayard C	Britt

HARDIN.

4937	Alberry, William F	Goodell
5115	Albertson, O. C	Hubbard
3983	Barber, Harry A	Iowa Falls
4699	Bohning, A. E	Ackley
2125	Corfe, Frederick	Union
4406	Corfe, William H	Union
4155	Cowan, John D	Iowa Falls
4783	Crossley, Mont	Hubbard
4926	Corfe, Edw. W	Union
2754	David, J. W	Alden
3032	De Marsha, Frank E	Radcliffe
3518	Eich, Jos. F	Alden
4348	Ellsworth, E. E	Eldora
1816	Finster, H. J	Steamboat Rock
561	Hammond, John H	Eldora
5124	Hunter, Ernest G	Eldora
5159	Hatelstad, Martin L	Radcliffe
4885	Junkerman, Julius	Ackley
5237	Keeneman, W. E	Whitten
207	Kolls, Conrad A	Ackley
3709	Koeneman, Eugene O	Whitten
5089	Marshall, Oliver E	Iowa Falls
5243	Miller, D. J	Iowa Falls
5270	Miller, J. J	Ackley
3771	Nix, John M	Ackley
4093	Pfander, C F	Ackley
4259	Readout, Albert	Union
489	Sheffield, Richard H	Eldora
2070	Swartz, J. L	Iowa Falls
4091	Symington, T. J	Ackley
4476	Schultz, Otto W	Alden
5075	Steeley, John H	Eldora
5125	Starr, George A	Eldora
4777	Swallum, R. R	Hubbard
3092	Winchester, E. E	Eldora
3963	Wagner, Oscar F	Alden

HARRISON.

4128	Berkeley, Samuel L	Woodbine
4763	Bracken, Z. E	Modale
4659	Brown, L. W	Missouri Valley
2817	Clark, S. W	Magnolia
2970	Dean, Frank A	Dunlap
1710	Ellis, Clark	Little Sioux
3429	Elliott, Sherman S	Missouri Valley
2016	Giddings, William	Logan
755	Hope, William H	Little Sioux
2936	Hill, F. M	Persia
4989	Harvey, Robert W.	Logan
4590	Jones, J. D	Logan
2823	Knecht, Allen A	Modale
2409	McColm, C. B	Persia
2571	McFarlain, Thomas	Mondamin
3127	McKay, B. A	Missouri Valley
3290	Morgan, Fred E	Logan
2548	Osborne, G. S	Missouri Valley
5082	Petersmeyer, Edw. C	Dunlap
2856	Randall, Charles T	Dunlap
3224	Reed, C. W	Woodbine
475	Satterlee, E. S	Dunlap
466	Satterlee, Dwight	Dunlap
852	Shiley, George P	Missouri Valley
4377	Taylor, C. W	Mondamin
4002	Yates, E. T	Logan

HAMILTON.

3645	Arthur, Herbert J	Webster City
3050	Bale, Will G	Webster City
3660	Cole, Victor F	Jewell Junction
3984	Cole, W. F	Jewell Junction
2247	Davis, Will A	Jewell Junction
4639	Dick, O. K	Webster City
2014	Fidler, J. D	Williams
2226	Griffith, J. C	Ellsworth
2724	Gerber, Louis M	Webster City
5279	Greiner, L. F	Blairsburg
2560	Holbrook, George A	Webster City
4167	Hamaker, G. E	Stanhope
4801	Keltz, Bert F	Webster City
2284	Marshall, A. J	Blairsburg
3001	Medberg, J. M	Webster City
4010	Miller, Ralph H	Stratford
4895	Madsen, M. P	Jewell
5093	Newman, Orace	Webster City
1909	Petersen, Peter C	Stratford
3172	Rodearmel, R. H	Randall
2427	St. John, L. E	River Sioux
4697	Schultz, W. B	Williams
1861	Teed, George W	Webster City
4473	Torrence, J. D	Kamrar
76	Walgamot, A. B	Webster City

HENRY.

833	Arnold, C. V	Mt. Pleasant
4073	Crew, A. S	Salem
4562	Drummond, O. M	Mt. Pleasant
5040	Ernst, C. C	Wayland
1319	Hanna, John W	Winfield
3165	Huston, Joseph E	Winfield
4694	Hughes, Ed. J	Mt. Pleasant
3292	Jericho, John H	Mt. Pleasant
832	Lyon, Smith	Mt. Pleasant
1820	Lindley, B. B	Winfield
3394	Lindley, J. M	Winfield
4515	Moore, Charles W	New London
3373	Moore, Alfred E	Wayland
3837	Ott, John R	Mt. Pleasant
837	Pyle, Samuel M	Mt. Pleasant
2156	Pierce, G. R	Salem
4261	Perkins, Ira A	Hillsboro
3804	Rouse, Charles H	Mt. Pleasant
5043	Rouse, C. O	Wayland
5081	Smutz, W. A	Hillsboro
827	Van Cise, Isaac P	Mt Pleasant
3592	Van Ausdale, G. Mack	New London
4622	Williams, A. H	Mt. Pleasant

HOWARD.

1491	Clemmer, J. J	Cresco
2949	Connolly, William	Cresco
4456	Clemmer, Percy A	Cresco
3819	Connelly, J. P	Cresco
3956	Dayton, D. D	Lime Springs
4877	Davies, W. T. T	Elma
4887	Eckstein, E. J	Chester
3861	Jackson, George H	Cresco
4903	Kissel, George	Cresoo
1954	Lowery, J. J	Cresco
4677	Love, John G	Lime Springs
4969	Lowery, Fred. B	Cresco
4916	Noblett, Roy C	Cresco
3599	Overfield, E. E	Elma
5217	Prann, W. E	Cresco
4627	Reed, J. W	Lime Springs
2357	Van Leuven, George M., Jr.	Lime Springs
2832	Wachtel, Leo. C	Elma

HUMBOLDT.

4594	Atzen, Charles B	Thor
5157	Arent, Andrew J., Jr	Bode
4308	Cole, H. B	Renwick
4684	Cole, Mrs. Ella C	Renwick
4937	Connor, Edward E	Livermore
3199	Doan, H. C.	Humboldt
4961	Daugherty, A. E	Livermore
2096	Frank, E. S	Livermore
4115	Gaugestad, L. M	Bode
3126	Hubbard, H. C	Humboldt
4901	Hack, Leon	Humboldt
5088	Hibner, Charles, Jr	Gilmore City
3611	Koontz, J. F	Humboldt
2939	McFarland, A. W	Dakota City
2143	McElwain, R. H	Hardy
3759	Pinckham, H. C	Livermore
5049	Preble, Charles H	Pioneer
3768	Ruse, A. E	Humboldt
4908	Smith, Roy B	Bradgate
5113	Vohs, G. L.	Ottosen
4714	Wilhelm, Elmer S	Livermore

IDA.

2567	Bilby, A. M	Galva
3054	Farnsworth, D. W	Galva
3550	Hunter, J. P	Arthur
2860	Johnson, Barnett	Ida Grove
4730	Kiner, F. O.	Ida Grove
4759	Loucks, J. C	Ida Grove
3947	Miller, Charles I	Galva
3014	Somers, J. W	Ida Grove
3263	Walker, John T	Holstein
3620	Wilson, Corydon L	Holstein

IOWA.

3966	Alt, George W	Williamsburg
1880	Baughman, Oliver F	North English
2441	Bosley, James E	Ladora
3781	Brown, L. E	Parnell
500	Eddy, William N	Marengo
1681	Fletcher, W. G	Williamsburg
3680	Foster, Theo. M	North English
3690	Goldthwait, T. O	Marengo
5133	Gwinn, E. H	Victor
3813	Haas, Fred	Marengo
5190	Koch, August F	Middle Amana
5191	McMahon, Thomas	Victor
2378	Nicol, Ira I	North English
4993	Perry, Thomas J	Millersburg
3737	Pentzer, Jacob L	Williamsburg
4773	Ross, N. K	Victor
2694	Schnell, T. J	Parnell
1797	Schadt, Conrad	Amana
5261	Schulte, J. F	Victor
1379	Toovey, William	Victor
5301	Tenscher, David	Victor

JACKSON.

4567	Ahlers, O U	Bellevue
4700	Avery, A. M	Maquoketa
2159	Belden, M. J	Canton
3702	Butterworth, H. O	Maquoketa
4546	Brown, Eugene F	Maquoketa
5175	Beck, J. Conrad	Bellevue
5147	Cantwell, J. Y	Maquoketa
5369	Daudel, H. A	Andrew
305	Dierkes, Charles	Bellevue
1224	Eldridge, Charles G	Sabula
508	Gotschall, George A	Miles
1235	Guenther, Jacob H	Sabula
1778	Hubbard, L. W	Monmouth
4129	Hintzen, N. J	La Motte
4848	Hanske, Ed. A	Bellevue
2800	Jenkins, Hugh	Preston
4669	Kranz, G. F	Bellevue
2532	Loose, D. N.	Maquoketa
4453	Marner, W. A	Miles
2556	Nitzsche, J. C	Maquoketa
861	Orcutt, G. B	Maquoketa
——	Rolling, John	Bellevue
4182	Young, C. C	Maquoketa

JASPER.

2505	Birchard, Rufus	Kellogg
5103	Burt, C. A	Colfax
4310	Cozad, C. B	Prairie City
1457	Dalrymple, A. L.	Monroe
4012	Downs, Horace S	Baxter
2310	Freeman, J. H	Prairie City
4972	Fowler, L. E	Lynnville
4727	Foster, W. C.	Newton
2049	Graham, C. C	Baxter
3654	Graff, J. E.	Colfax
4124	Hindorf, A. E	Newton
4977	Johnson, Frank W	Prairie City
1597	Jones, G W	Valeria
989	Keisel, H. L	Newton
3403	Kennedy, Arthur L	Newton
4235	Lounsberry, John B	Valeria
932	Parmenter, R. F	Newton
1153	Quire, Charles E	Newton
3443	Riddle, N. D	Prairie City
2380	Ryan, J. R	Colfax
4928	Riddle, C. H	Prairie City
931	Skiff, Harry J	Newton
975	Smith, John R	Kellogg
3789	Shea, J. W	Colfax
2124	Trotter, W. R	Valeria
2656	Turner, L. C. S	Colfax
4936	Tabler, E. F	Colfax
2991	Wagley, O. N	Newton
4230	Weirick, Harry A	Colfax
4366	Westbrook, Burr	Monroe
5136	Wanberg, George E	Baxter
5277	Wilson, O. N	Monroe

JEFFERSON.

587 Clark, G. D........................Fairfield
3862 Collins, D. C......................Fairfield
4339 Curtis, H. M.....................Packwood
4593 Carse, G. H ....Packwood
5134 Copeland, Jay ....Fairfield
3911 Graham, H. A......................Fairfield
808 Hill, T. W. ....Batavia
586 Higley, H. D........................Fairfield
5150 Hufford, Ed. H...............
1053 Mealey, David H.........Pl
4625 Marsh, Walter V... ....
5253 Peterson, William J. ....
3151 Slater, Willis O.. ....
4514 Shriner, Frank S...........
1703 Thoma, Louis...............
5298 Thoma, Stephen R..........

JOHNSON.

215 Boerner, H. W..................Iowa City
3162 Boerner, Edw. A...... ....Iowa City
3276 Boerner, Emil L................Iowa City
4004 Boschnagle, Frank.............Lone Tree
5141 Beaman, S. Alcinda............Iowa City
5248 Brown, Joseph W..............Iowa City
1023 Doty, Elmer A..................... Oxford
1903 Davis, M. W ....Iowa City
3812 Euler, Frank.....................Iowa City
2212 Foltz, George F.................Iowa City
3130 Graff, W. H......................Iowa City
3692 Hoffer, A. E..........................Solon
4822 Jester, Lula B..............
2757 Louis, Henry ....
2979 Loosley, Winfred Ruth.....
4523 Morrison, W. W......... ...
5070 Mutchler, Jacob S..........
3825 Northup, Albert S..........
1906 Robinson, Hiram A........
4731 Rawhouser, J. L.. ....
721 Shrader, W. E..............
2988 Shrader, Charles A........
4297 Whittaker, J. C............
5230 Williams, Harlan D........

JONES.

841 Backer, John H................Monticello
1824 Babcock, E. M...................Wyoming
5163 Brock, W. B ....Olin
3202 Grimwood, A. E.........Oxford Junction
4633 Holt, Ed. S.......................Anamosa
3173 Howard, O. R....................Anamosa
843 Kempf, Albert H...... ....Monticello
4626 Lamson, C. O....................Anamosa
4378 Mackrill, W. A............ ....Onslow
5064 Miller, George........................Olin
4467 Ormsby, F. E................
844 Putnam, Rufus A..........
3676 Port, Frank W..............
275 Skinner, William B........
277 Skinner, Mary A...........
2457 Sigworth, M. P.............
4173 Sigworth, D. B.............
4293 Soetige, O. H...............
1942 Tiarks, Herman............
5185 Thomas, F. H...............

KEOKUK.

3504 Allison, S. M..........................Nassau
4455 Bowman, I. L.................Martinsburg
4280 Baker, Geo. D....................Richland
3112 Cameron, I. F.. ....Keswick
3651 Coffman, W. T.............South English
5128 Corwin, J. W........................Kinross
687 Eaton, J. E.......................... Keota
2469 Engeldinger, Peter..............Hedrick
4190 Eastburn, W. W..................Hedrick
3043 Franken, Edw....................Sigourney
4543 Ford, Jesse ....What Cheer
136 Griffith, J. A..................What Cheer
5087 Griffith, Leonard E..........What Cheer
57 Himrod, Mrs. D. M ....What Cheer
4744 Hamilton, Ralph C...... ....Keota
3718 Holmes, W. L.........................Keota
4787 Hoffner, F. F....................Sigourney
3977 Harris, W. W...............
4973 Holden, J. P.... .. ..
699 McFarlane, Daniel.........
3170 McKinnis, C.................
3124 Platt, W D....................
2592 Richardson, J. F............
3985 Reinert, C....................
5021 Reinert, Henry...... ......
4161 Shakspear, Geo.............
4267 Sands, Francis G...........
3137 Schriever, Wm ....
4553 Schriner, Chas A...........
5073 Valerius, Matt...............
977 Vittetoe, Hiram C..........
3796 Weller, R ....
4470 Weller, Wm..................
4924 Weller, A. J.............. .

KOSSUTH.

3794 Anderson, Ollie H.................Wesley
4099 Anderson, E. C...................Bancroft
5148 Adams, H. C ....Algona
2224 Butts, F. M.......................... Wesley
2432 Burnett, Milo T...................Luverne
3216 Berryman, A. J...................Bancroft
4791 Bleich, Herman E.............. Ledyard
4505 Cronk, Alfred P... ....Bancroft
958 Durant, A. H ....Algona
959 Durant, H. ....Algona
4503 Falkenhaimer, Al.......... ......Algona
1483 Garfield, L. K.......................Algona
4316 Groneman, F. C..............Whittemore
4875 Goodman, C. G...................Luverne
3089 Hall, Lincoln. ....Burt
3615 Hoffman, Charles F........
4054 Heal, Frank.......... ....
2797 Lacy, George. ....
4898 Lien, Albert E..............
5015 Louder. William.............
3949 Miller, Frank T.............
4815 Miles, Charles L......... ..
240 Sheetx, L. A ....
3898 Studley, William J.........
4028 Stone, N. E..................
4880 Spencer, Harry D..........
5077 Simpson, G A...............
5218 Saunders, H. A.............
5254 Specht, August R.. ....
5061 Tiss, George I...............

LEE.

1667	Axt, Julius H.	Ft. Madison
498	Blackinton, William N	Denmark
2997	Burlingham, E. H	Ft. Madison
2137	Camp, Eli R	Keokuk
4098	Cunningham, Charles L.	Keokuk
4929	Davis, C. R	Donnelson
142	Fuller, Charles M	Keokuk
1724	Heiser, Rudolph	Keokuk
1576	Ingalls, Jos. E	Denmark
663	Kerr, David A	Keokuk
691	Kiedaisch, Fred J	Keokuk
3088	Kiedaisch, J. Fred, Jr	Keokuk
3805	Laubach, Clarence A	Keokuk
4059	Lampe, Theo. J	West Point
4415	Larmon, A	Donnelson
695	McGrath, Thomas J	Keokuk
4648	McKeehon, William H	Ft. Madison
3905	O'Reilly, W. F	Keokuk
122	Peters, C. W	Ft. Madison
118	Reisner, F. O	West Point
1238	Reeves, I. C	Keokuk
1723	Roos, Julius G	Keokuk
4163	Richard, Lizzie	West Point
4721	Rigg, J. Roy	Keokuk
736	Stempel, Arthur H	Ft. Madison
1548	Salmon, Theodore	Ft. Madison
1940	Schaefer, George H	Ft. Madison
2638	Surry, William M	Keokuk
3766	Schmidt, Henry E	Keokuk
4166	Schafer, Robert R	Ft. Madison
4789	Salmon, H. M	Ft. Madison
4838	Stempel, William C	Ft. Madison
4717	Smith, E. F	Keokuk
4949	Sanderson, Charles R	Montrose
1851	Thomas, Camp	Ft. Madison
866	Ward, Thomas	Montrose

LINN.

2506	Adams, Charles R	Cedar Rapids
2361	Alexander, T. R	Marion
4933	Armstrong, E. F	Cedar Rapids
791	Beech, Thomas C	Cedar Rapids
1254	Beach, Ed M	Troy Mills
4015	Bourne, Frank	Alburnette
4064	Benson, Nelse J	Prairieburg
4985	Boyson, G. H	Cedar Rapids
10	Cain, John G	Polo
3784	Culbertson, James W	Center Point
4488	Carman, C. P	Cedar Rapids
4768	Cole, Omer L	Cedar Rapids
340	Dunbar, George B	Center Point
2507	Dostal, Joseph L	Cedar Rapids
4614	Emerson, R. W	Cedar Rapids
1851	Fox, Jacob G	Waubeek
1783	French, Charles H	Cedar Rapids
5091	Gitchell, J. H	Walker
1198	Hopper, Byron M	Springville
3220	Hibner, George M	Marion
3706	Hall, L G.	Coggon
4179	Hogle, Isaac W	Mt. Vernon
4359	Holmes, George B	Cedar Rapids
4746	Heasler, Henry F	Mt. Vernon
795	Haman, George C	Cedar Rapids
2655	Hayes, J. W	Cedar Rapids
4835	Jones, A. F	Cedar Rapids
5118	Johnson, T. W.	Cedar Rapids
754	Kittering, Solomon	Lisbon
2383	Keys, J. N	Walker
3099	Lee, J. Allison	Lisbon
3778	Lillis, L. M	Marion
3803	Listebarger, L. H	Cedar Rapids
5037	Lee, Thomas Macy	Lisbon
2717	Mateer, John B	Cedar Rapids
3422	Mitchell, Albert S	Cedar Rapids
3348	McCandless, Harry A	Cedar Rapids
4438	McKown, J. W	Cedar Rapids
3027	Owen, C. N	Marion
3955	Owen, Luther P	Marion
3934	Pitkin, F. O	Cedar Rapids
4578	Ryan, C. D	Cedar Rapids
5272	Richards, W. W	Cedar Rapids
973	Stevens, D. D	La Fayette
1865	Smerbeck, R	Cedar Rapids
3205	Severa, W. F	Cedar Rapids
3240	Schminko, F. C. H	Marion
3159	Svacha, Frank	Ely
4420	Schomler, Charles E	Cedar Rapids
4457	Swan, A. B	Walker
4665	Sargent, Frank L	Marion
4840	Skvor, John M	Cedar Rapids
4795	Trueblood, W. A	Central City
498	Trueblood, John	Central City
5074	Vosmek, J. H	Cedar Rapids
411	Wilson, L. L	Center Point
811	Weller, William L	Cedar Rapids
1777	Wright, George J	Waubeek
2617	Ward, Perry	Central City
2461	Wheat, Joseph G	Mt. Vernon
3665	Wilson, James B	Marion
4539	Whelihan, J. Frank	Cedar Rapids

LOUISA.

4241	Brown, Harry L	Columbus Junction
4786	Brown, J. W	Oakville
5247	Blanchard, H. E	Wapello
2128	Cochran, M. H	Morning Sun
4892	Cilly, Will W	Morning Sun
5288	Curran, W. D	Morning Sun
4745	Gipple, L. U	Letts
3806	Hendrix, N. T	Columbus Junction
4996	Lespinasse, A. F. H. de	Oakville
1868	Plitt, H. A	Wapello
4736	Robertson, Samuel	Columbus Junction
4237	Salmon, G. A	Columbus Junction
2763	Thompson, A. O	Columbus Junction

LUCAS.

3758	Beaman, James D	Chariton
3385	Briles, W. R	Chariton
917	Dunn, John W	Derby
3655	Jones, E S	Chariton
3790	John, G. W	Lucas
2333	Kirk, Charles R	Chariton
128	Newell, W. M	Russell
1084	Sprague, J. F	Russell
1119	Storie, D. O	Chariton
2434	Stover, Noah W	Lucas
3330	Starr, John W	Chariton
2962	Yocum, A. L	Chariton
3376	Werts, Jacob L	Russell
3433	Whitlock, George E	Chariton
4216	Whitlock, C. E	Chariton

LYON.

4101	Andrews, Willis E	Rock Rapids
4729	Amsberry, A. L	Lester
3850	Brink, H. J	Doon
4893	Bradshaw, S. M	George
2959	De Neui, John P	George
5127	Fahey, E. W	Alvord
4982	Getman, N. E	Larchwood
2206	Horton, Frank A	Rock Rapids
4006	Hoff, J. A	Doon
3864	Jones, Rowland	Lester
4556	Kaplan, J. G	Rock Rapids
4097	Lewis, Alfred W	Inwood
4683	Page, W. F	Alvord
2879	Wycoff, Will C	Rock Rapids
4670	Williams, J. R	Larchwood
4850	Wismer, Alvin E	Little Rock

MADISON.

3981	Anderson, E. K	St. Charles
4474	Adams, H. D.	Winterset
3325	Catterlin, S. E	Winterset
4504	Cottam, Charles M	St. Charles
3470	Griswold, E. B	Earlham
1785	Henshaw, John	Winterset
4855	Hutchinson, J. A	Truro
4808	Henry, Wilbur J	Winterset
3972	Nelson, J. V	
3413	Painter, William	
3722	Peek, Samuel E	
4279	Peek. J. O	
3865	Rutledge, George L	
4109	Smith, J. E	
4641	Schreves, George W	
3667	Smith, M. E	

MAHASKA.

315	Beardsley, William	Beacon
1042	Beechler, George N	Oskaloosa
4148	Blakeslee, J. H	Oskaloosa
4188	Busby, John R	Rose Hill
4215	Bertsch, George P	Oskaloosa
5283	Brattain, James	Oskaloosa
4575	Barnett, J. M	New Sharon
935	Carson, George	New Sharon
1489	Cole, D. R	Oskaloosa
3710	Cooper, B. F	Muchakinock
4466	Cunningham, C. E	Oskaloosa
5165	Carson, Sadie M	New Sharon
4357	Dale, John R	Fremont
4492	Elerick, J. S	Muchakinock
2459	Green, F. E	Oskaloosa
2424	Hinton, G. A	Oskaloosa
2744	Hugg, A. A	Oskaloosa
2540	Henderson, Joseph S	Muchakinock
3176	Johnson, Alfred	
4249	Kramme, Henry W	
5267	Lewis, John W	
1036	Morgan, J. W	
2761	Nugent, E. D	
3021	Nugent, H. D	
3941	Newbrand, David	
2766	Pickett, John H	
2940	Pike, Charles C	
1997	Reel, Z T	
2086	Reel, A. R	
3268	Thomas, J. C	
3574	Vincent, George I	
4839	Vickers, Will	
2407	Wilson, Jesse	
3650	Wray, J. W	
4049	Williams, Jack	

MARION.

5249	Allen, Will L	Pella
1417	Brinkhoff, F. W	Pella
3519	Bare, O. H	Pleasantville
3850	Brinkhoff, Carl W	Pella
492	Cole, T. R	Marysville
4776	Craddick, W. W	Knoxville
4829	Cloe, John W	Knoxville
2122	Elliott, W. V	Knoxville
1063	Forsythe, W. D	Pella
3087	Fulton, A. H.	Knoxville
5004	Hollowell, J. E	Swan
543	Kirkwood, T. J	Otley
544	Kirkwood, J. W	
1070	Keables, B. F	
1071	Keables, J. B	
1973	Keables, H. S	
1051	Litchfield, A. N	
5167	Lyon, Charles	
4031	Park, L. E	
4966	Ritchie, J. W	
5194	Shadle, F. S	
675	Woodruff, M. W	
2746	Wright, L. D	

MARSHALL.

5039	Alexander, J. M	Marshalltown
4866	Armour, F. C.	Marshalltown
1181	Brimhall, S. M.	State Center
1232	Bishop, E. W	State Center
3880	Brimhall, W. F	State Center
3705	Dunkle, W. B	Gilman
4268	Dobson, Mrs. M. H	Le Grande
3582	Ehle, C. E	Marshalltown
4070	Elder, A. T	Marshalltown
4158	Evans, W. H	Marshalltown
5111	Everette, Orion	Marshalltown
1925	Frost, C. E	Rhoades
4777	Garey, C. E	Marshalltown
2372	Jones, T. B	Melbourne
1158	Lander, Chas. J	Marshalltown
5113	Lander, C. J., Jr	Marshalltown
1409	McBride, W. S	Marshalltown
2517	Mitchell, A. F	Marshalltown
2611	Mayer, Peter	Marshalltown
2826	Masterson, J. B	Albion
2885	Morgan, B. A	Marshalltown
3404	McBride, R. W	Marshalltown
3619	Mershon, G. A	
4591	Marschell, C., Jr	
4532	Maytag, T. H	
4763	McDonald, J. E	
4475	Nix, Mike	
4724	Newman, C. T	
1161	Powers, Geo. P	
2435	Plumb, W. T	
2617	Sieg, H. C	
3838	Suley, Chas. A	
3983	Smith, M. R	
4162	Stone, C. F. M	
4446	Swift, T. C	
5000	Sorensen, Hans	
5192	Tisdale, Will H	
606	Ward, Jas. A	
607	Ward, W. J	
2986	Wiley, Frank B	
4347	Woodward, Will C	
3772	Woodward, H. H	
4136	Vail, Ed M	

MILLS.

4647	Bleakney, E. L	Glenwood
3515	Chapin, Geo. C	Hastings
2433	DeWitt, C. H	Glenwood
595	Edwards, M. G	Glenwood
238	Flammant, M	Mineola
5053	Foster, Omar G	Emerson
3711	Goodwin, F. L. B	Malvern
533	Gwathmer, G. O.	Glenwood
2715	Howe, A. J	Glenwood
3712	Harrison, J. C	Pacific Junction
4909	Holtzinger, P. S	Emerson
1629	Leith, Geo. E	
147	Moore, J. B.	
605	McCluskey, M. H.	
901	Munger, James P	
1214	Moore, Wm. G	
5293	McGrew, L. W	
2707	Royce, C. S	
4977	Redmond, I. F	
554	Shipman, R. M	
4536	Skillicom, W. M	
5022	Wilson, W. D	

MITCHELL.

4230	Ady, R. W	Osage
1039	Evans, W. L	Osage
3223	Goodall, Parr	Osage
4704	Graves, Alva V	Riceville
1037	Lezott, Chas. H	Osage
3539	Medowell, Arthur	Little Cedar
1847	Powell, L. E	McIntyre
4349	Robb, W. M	Carpenter
3691	Richmond, E. C	Riceville
219	Schancks, F. B	West Mitchell
3044	Sampson, F. W	Osage
5197	Smith, Glendon J.	Riceville
5295	Scheu, L. C	Stacyville

MONONA.

4978	Arnold, W. B	Whiting
4658	Bray, Frank B	Ute
4915	Banks, E. P	Ute
3060	Dyer, F. W	Mapleton
4087	Egli, E. E	Onawa
838	Griffin, F	Mapleton
4513	Griffin, C. F	Mapleton
2484	Handel, D	Onawa
5016	Kennedy, Chas. S	Whiting
2318	Lass, D. G	Rodney
2803	Mann, A. W	Onawa
2936	Minthorn, M. F	Moorehead
4144	Moad, C. L	Ute
5081	Minthorn, Edith	Moorehead
3154	Putzier, H. J	Mapleton
33	Rust, David	Whiting
5297	Thomas, J. J	Whiting
3944	Wheeler, C. H	Blencoe

MONROE.

776	Bissell, C. E	Lovilla
3104	Bartram, R. P	Albia
4198	Carden, George R	Albia
5144	Johnson, Edwin R	Monroe
278	Morrison, J. C	Albia
279	Morrison, Ella A	Albia
4568	Miller, George D	Albia
5202	Murray, Wm. P	Melrose
971	O'Conner, J. C	Melrose
857	Roberts, James W	Albia
4507	Woodruff, W. J	Foster

MONTGOMERY.

121	Artz, David	Red Oak
2229	Cary, George T	Grant
3256	Childs, E. W	Villisca
4300	Collins, E. C	Red Oak
3245	Erricsson, G. B	Red Oak
4401	Gregory, F. E	Red Oak
2342	Hine, C. W	Stanton
206	Hinchman, A. C	Red Oak
3347	Hulett, A	Red Oak
4991	Hully, H. D	Elliott
4313	Luce, John	Villisca
2316	Lynch, L. J	Villisca
3443	Mollenhoff, J. P	Stanton
4970	Ordway, Cora	Elliott
2942	Platt, George M	Red Oak
2538	Sproul, C. H	Red Oak
3419	Stillians, W. A	Villisca
3755	Shank, H. W	Red Oak

MUSCATINE.

1294	Agnew, D. G	Wilton Junction
2098	Bentley, Wm. E	Muscatine
3116	Busch, Wm. C. A	Muscatine
4174	Barkalow, W. B	Atalissa
4256	Braumworth, Alice L	Muscatine
874	Cannon, J. H	Muscatine
1450	Cooling, A. A	Wilton Junction
3061	Cope, W. L	Muscatine
3660	Carl, F. F	Nichols
868	Deutschmann, Aug	Muscatine
1525	Daugherty, J. B	Muscatine
4068	Farner, R	Wilton Junction
867	Geiss, Henry	Muscatine
2695	Graham, E. L	Muscatine
2782	Hampton, R. B	West Liberty
3110	Havercamp, J. J	Muscatine
3421	Henderson, E. L	West Liberty
4380	Henderson, Charles R	West Liberty
4266	Hazlett, J. C	Atalissa
1800	Krehe, J. T	Muscatine
2868	Kuchmann, J. Theo	Muscatine
2074	Lane, L. L	Muscatine
1641	Marolf, J. F	Wilton Junction
3746	Moore, G. A	West Liberty
4611	McBride, W. H	Muscatine
50	Nesper, Fred. T	Muscatine
1299	Pickering, C. E	West Liberty
1441	Reimcke, G. A	Muscatine
1647	Zeisig, C. A	Moscow

O'BRIEN.

1208	Ayers, W. L	Sheldon
4444	Algyer, C	Sanborn
4058	Barmore, V. A	Sutherland
4869	Barrager, E. L	Sheldon
4563	Cushman, R. A	Sanborn
3318	Damas, F. J	Primghar
4851	Drake, L. C	Hartley
4035	Fitton, James F	Paullina
5063	Farran, John S	Paullina
3340	Hassels, J. C	Primghar
4254	Hughes, Thomas	Hartley
5035	Miller, Milton Earl	Hartley
2360	Parker, E. W	Sutherland
3684	Paine, F. E	Paullina
2286	Schoel, A	Sanborn
3392	Stewart, D. T	Hartley
5065	Shaffner, W. W	Sanborn
5199	Shipley, L. U	Sheldon
5222	Shipley, Henry	Sheldon

OSCEOLA.

3369	Carmichael, J. H	Ashton
3623	Cook, C. A	Ocheyedan
1256	Giles, Daniel R	Harris
5058	Graves, F. W	Harris
2910	Hamilton, R. G	Harris
1210	Lawrence, W. R	Sibley
1236	Parker, W. L	Sibley
4512	Parker, C. E	Sibley
3058	Stevens, W. B	Sibley
3368	Smith, A. E	Harris

PAGE.

323	Burrows, John P	Clarinda
360	Bagnall, John I	College Springs
2150	Berryhill, William	Clarinda
4149	Blair, F. L	Clarinda
3991	Dodson. Willaim F	Shenandoah
4726	Dixon, F. A	Shenandoah
4231	Eaton, H. E	Essex
4580	Faus. Charles A	Clarinda
4178	Gauss, M	Coin
2461	Hite, Robert B	Clarinda
2585	Henderson, W. A	Clarinda
3046	Jay, George	Shenandoah
8795	Johnson, Charles J	
4378	Johnson, Dee W	
4953	Jeffrey, Frank D	
1706	Lundy, W. L	
4619	Luers, John H	
3904	Newquist, F	
2588	Pruitt, George A	
2918	Putnam, T. S	
4491	Pennebaker, J. W	
2533	Robbins, C. A	
1241	Webster, J. O	
4232	Wade, Abigail D	

PALO ALTO.

2200	Anderson, Edwin	Ruthven
4958	Anderson, J. H	Curlew
1892	Burnes, J. O	Emmetsburg
2497	Bachmen, E. W	West Bend
4558	Barrett, W. H	Mallard
5280	Babcock, H. M	Ruthven
1708	Carmichael, J. H	Emmetsburg
3071	Cuplin, P. P	West Bend
4243	Cuplin, H. S	West Bend
4201	Cox, James E	Ruthven
4818	Collins, T. D	
567	Henry, W. G	
3807	Herley, G. F	
4350	Higbee, U. B	
5290	King, R O	
2750	Stemets, John	
556	Wolfgang, A. J	
4703	Wilson, W. E	
4960	Wilson, Ed. J	

PLYMOUTH.

4421	Bernhardt, J. M	Le Mars
214	Carter, George	Le Mars
220	Diehl, Philip H	Le Mars
4449	Gallagher, Joe	Akron
3617	Hunter, James E	Remsen
5017	Horton, F. E	Struble
5122	Jones, Charles H	Le Mars
5059	Klise, William J	Le Mars
4472	Luehrs, O. G	Remsen
3890	Meinert, F. G	Remsen
4168	Mead. N	Akron
5014	McArthur, Wallace	Le Mars
5092	Mead, N. P	
5234	Mammen, Martin H	
4344	Nigg, H. A	
5086	Nicolls, F. F	
3701	Roberts, Samuel	
4141	Sartori, Anton	
4572	Spotts, S. W	
4673	Schoofs, J. J	
2666	Wilder, John J	
3388	Wilson, C. W	
3843	Wilson, Lee S	

POCAHONTAS.

5121	Anderson, Elijah A	Fonda
265	Brenton, A. G	Plover
3418	Bollard, J. B	Fonda
3817	Beam, Charles H	Rolfe
1670	Carroll, S. M	Laurens
3188	Core, George W	Rolfe
4328	Colgan, F. L	Gilmore City
5173	De Lange, James	Laurens
4945	Day, George W	Plover
2908	England, L. E	Gilmore City
4964	Epperly, Clyde C	Rolfe
4001	Glenn, A. A	Plover
3464	Higgins, J. W	
4234	Hughes, Ralph E	
2397	Jones, S. C	
3829	Jones, Paul W	
4871	McMannus, F. W	
2957	McMichael, A. O	
4959	Norton, N. L	
3866	Patty, C. C	
3577	Sheldon, J. B	
3248	Webb, Charles M	
3603	Wievel, Joseph	

POLK.

1709	Arnold, Charles	Des Moines
3568	Adams, John O	Des Moines
4843	Aldrich, F. S	Des Moines
3214	Beidenkopf, George M	Des Moines
3401	Begun, Charles A	Des Moines
1729	Baker, Charles W	Des Moines
3428	Barnard, Charles G	Des Moines
4184	Barlow, O. J	Des Moines
4444	Blair, Milton M	Des Moines
4461	Blagburn, John F	Des Moines
4542	Burns, Charles E	Des Moines
4575	Barnett, J. M	Mitchellville
4828	Briar, John	Des Moines
5246	Babcock, C. B	Des Moines
2234	Cogswell, S. G	Des Moines
3547	Chapman, C. C	Des Moines
1889	Chamberlain, Lowell	Des Moines
3653	Cox, G. W	Des Moines
4186	Carpenter, Oscar O	Des Moines
4332	Crawford. Harry B	Des Moines
4388	Cowles, V. D	Des Moines
4596	Conklin, W. S	Des Moines
4664	Carpenter, Fred. F	Des Moines
5154	Coon, Lloyd B	Des Moines
1692	Duke, Charles D	
3791	Durette, R. G	
4183	Diddy, Cad	
4387	Davis, Frank R	
4766	Dwyer, J. C	
5036	Durette, Ella B	
5012	Easton, Ernest K	
3742	Engleen, C. J	
3215	Eaton, F. N	Val
4193	Eade, J. W	
5027	Fellows, William B	
5183	Ferney, James L	
4189	Graham, Will A	
1130	Huegle, H. W	
431	Hippee, Warren	
1518	Hansen, H. C	
1687	Harlan, Charles E	
1689	Hammer, Alfred	
2242	Hammer, Alvin G	
2981	Howard, Fletcher	
3774	Hufford, W. S	
4013	Homann, Richard	
4142	Henry, W. P	
4424	Hufford, G. E	

POLK—Continued.

	Mitchellville
	Des Moines
	Des Moines
	Des Moines
	Des Moines
	Des Moines
H	Des Moines
T	Valley Junction
	Des Moines
A	Des Moines
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L	Des Moines
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J	Des Moines
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E	Des Moines
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P	Des Moines
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k H	Des Moines
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A	Des Moines
arl R	Des Moines
	Des Moines
	Des Moines
	Des Moines
F	Des Moines
	Des Moines
	Des Moines
	Des Moines
k	Des Moines
	Des Moines
	Des Moines
	Des Moines
	Des Moines
B	Runnells

4538	Patterson, H. O	Des Moines
182	Rogg, Charles W	Des Moines
427	Randolph, Jacob W	Des Moines
902	Reichard, D. H	Des Moines
2846	Randolph, Frank	Des Moines
3544	Rogers, E. E	Des Moines
4083	Reichard, W. F	Des Moines
4550	Rehkopf, A. H	Des Moines
734	Stephenson, A. C	Des Moines
1128	Schroeder, Frederick	Des Moines
1129	Sandholm, John	Des Moines
1685	Souers, Webb	Des Moines
1712	Schmucker, D. R	Des Moines
2015	Shaffer, Lewis	Altoona
2129	Spaulding, Suel J	Des Moines
2431	Shope, Edwin B	Des Moines
2748	Stewart, W. J	Grimes
2841	Schmidt, Louis	Des Moines
2969	Stream, Curtis	Des Moines
3189	Smith, A. B	Des Moines
3436	Sanford, H. Clay	Des Moines
3744	Stewart, Mrs. Ella A	Grimes
3905	Sheldon, Frank	Des Moines
3967	Shaffer, W. B	Des Moines
3992	Shope, C. C	Des Moines
4075	Stroud, J. S	Des Moines
4268	Smith, R. H	Des Moines
4315	Seyfert, Harry L	Valley Junction
4679	Steelsmith, Frank R	Des Moines
5018	Snoke, Jacob F	Runnells
5080	Sternberg, Walter	Mitchellville
5244	Stroud, Philip E	Des Moines
2768	Toby, E. F	Des Moines
4747	Thalenhorst, C. E	Des Moines
4905	Talboy, Thomas	Des Moines
2851	Varner, T. H	Des Moines
4583	Veatsch, E. S	Des Moines
5274	Vrooman, Fred. E	Des Moines
679	Ward, C. H	Des Moines
980	Ward, Milo W	Des Moines
881	Wood, Annie L	Des Moines
1683	Wells, Willis C	Des Moines
2104	Wood, W. W	Des Moines
3168	Whitney, E. F	Des Moines
3254	Woodman, J. W	Des Moines
3140	Wetherell, F. D	Des Moines
3411	Wood, Frank	Des Moines

POTTAWATTAMIE.

	Council Bluffs
J	Council Bluffs
m H	Council Bluffs
	Walnut
	Council Bluffs
	Council Bluffs
	Walnut
F	Avoca
	Council Bluffs
	Council Bluffs
	Council Bluffs
	Council Bluffs
	Oakland
	Macedonia
	Avoca
	Council Bluffs
R	Neola
	Council Bluffs
	Avoca
	Council Bluffs
	Carson
	Carson
rles L	Carson

2906	Lenocker, A. A	Oakland
4579	Lehman, Max	Minden
5286	Litzrodt, Edward P	Council Bluffs
2148	Mitchell, A. I	Macedonia
2874	Morgan, Dell G	Council Bluffs
3185	Maxwell, W. J	Avoca
4177	Mudge, L. H	Council Bluffs
4637	McElroy, E. K	Ayrshire
4687	Morgan, F. H	Council Bluffs
4779	Massenburg, Lou	Council Bluffs
4648	Powers, E. A	Walnut
2924	Rogan, William H	Council Bluffs
4323	Robbins, F	Neola
3125	Stemple, G. L	Macedonia
1682	Stuart, J. D	Council Bluffs
3554	Sellers, Frank E	Council Bluffs
4218	Swarm, C. P	Oakland
4437	Smart, F. G	Hancock
4827	Spaulding, Joe	Council Bluffs
2047	Van Ness, Isaac T	Neola
3285	Whaley, Samuel E	Council Bluffs
3892	Wyland, A. O	Underwood
4432	Wesner, Fred W	Council Bluffs

POWESHIEK.

	Grinnell
	Grinnell
	Montezuma
	Deep River
	Malcom

621	Gruwell, Charles B	Grinnell
3505	Griffin, Charles J	Montezuma
3557	Hedges, Thomas M	Grinnell
3899	Hedges, Florence L	Grinnell
5152	Hedges, Grace L	Grinnell

POWESHIEK—CONTINUED.

620	Johnson, Joseph G	Grinnell
3484	Lewis, G. W	Grinnell
3101	Miller, C. E	Grinnell
3901	McConnell, Paul G	Grinnell
4409	McGuin, George B	Grinnell
1118	Ormiston, J. S	Hartwick
4686	Platt, J. H	Montezuma
1152	Quire, James C	Searsboro
3242	Rainsburg, A. P	Brooklyn
3909	Roe, Charles P	Grinnell
3242	Rainsburg, C. T	Brooklyn
5271	Romaine, Ernest	Grinnell
2613	Shrader, Frank P	Brooklyn
2894	Sanders, J. C	Deep River
4360	Talbot, Arthur D	Brooklyn
4170	Winchell, John E	Malcom
4522	Wilson, George W	Montezuma

RINGGOLD.

3129	Asbury, T. P	Tingley
4975	Armitage, A. C	Ellston
873	Belding, Albert L	Knowlton
707	Camp, Americus	Kellerton
708	Camp, Marshall	Kellerton
4114	Elder, William E	Tingley
4780	Elder, Alice Waugh	Tingley
911	Horne, John	Mt. Ayr
4337	Jessup, A. E	Caledonia
3790	Loomis, F. W	Shannon City
3084	Merrill, John T	Mt. Ayr
4941	McClanahan, W. A	Redding
4407	Reed, H. J. C	Diagonal
5259	Seaton, S. H	Maloy
3523	Warren, B. C	Mt. Ayr

SCOTT.

2	Binford, Edmund	Dixon
4967	Ballard, Harry W	Davenport
449	Ballard, John W	Davenport
731	Busch, Theo. H	Davenport
4260	Braunlich, Hugo G	Davenport
1609	Clark, Edwin A	Princeton
3647	Chase, Charles V	Davenport
4861	Campbell, L. R	Davenport
4764	Cope, Francis C	Davenport
4489	Carlisle, Glenn M	Buffalo
2900	Driscoll, J. E	Davenport
4276	Dorgan, John J	Davenport
4207	Doyle, William S	Davenport
4495	Danquard, Theo	Davenport
4904	Diamond, J. A	Le Claire
443	Emeis, Hugo A	Davenport
470	Harrison, Charles E	Davenport
4041	Harrison, J. H	Davenport
4932	Heuple, Frank C	Buffalo
436	Kemmerer, Charles P	Eldridge
440	Koch, Peter Theo	Davenport
3628	Koechert, Paul H	Davenport
3769	Kistenmacher, Emil J	Davenport
4116	Koch, Francis J	Davenport
4712	Klenze, John E	Davenport
535	Meisner, Amilius	Davenport
3801	Moetzel, Ernest A	Davenport
4947	Moffat, John H	Davenport
3950	Nadler, Frank	Davenport
2247	Pape, Herman G	Davenport
1885	Riepe, A. C. H. E	Davenport
4445	Rolfes, Herman	Davenport
447	Schlegel, Gustav	Davenport
2897	Schlegel, Carl E	Davenport

SHELBY.

2618	Boyd, John R	Defiance
2854	Branson, W. S	Irwin
3074	Berringer, Will J	Defiance
634	Frost, Lewis D	Harlan
1216	Fagan, Horace M	Shelby
1866	Fretz, Menzo	Harlan
4931	Gregerson, James	Harlan
2422	Harmon, James A	Irwin
4023	Jones, Lowell H	Shelby
3883	McColm, T. L	Panama
2675	Paxton, J. F	Harlan
3833	Reed, John D	Portsmouth
2302	Swennings, Frank J	Panama
4127	Strunk, Herman J	Earling

SIOUX.

2253	Brush, George W	Sioux Center
2523	Brewer, J. H	Hawarden
3491	Brink, Milber	Boyden
4605	Bunting, Mrs. F. M	Rock Valley
4362	Coad, James A	Hull
4610	Culver, Edgar R	Matlock
4627	Coad, N. G. O	Hull
2922	De Kruif, P. J	Orange City
2456	Geselschap, A. F	Orange City
——	Grady, M. J	Hawarden
1695	Harlan, L L	Hawarden
3615	Hoffman, Charles F	Hull
4287	Holihan, J. H	Hospers
4650	Hildesheim, Jacob J	Maurice
4608	Knapp, Georgiana	Hull
3123	Leland, W. L	Hawarden
2578	McBride, C. M	Rock Valley
3964	Mulder, D	Sioux Center
4651	Mosher, A. H	Ireton
4384	Parsons, Albert H	Ireton
2835	Pember, H. H	Rock Valley
4691	Parker, Ernest R	Ireton
4760	Phelps, O. W	Hawarden
2370	Quigley, W. A	Hawarden
2796	Reynolds, G. D	Rock Valley
2142	Stoll, L. S	Sioux Center
3432	Stoll, W. W	Sioux Center
4628	Schaul, Alphonse	Alton
4363	Vosburg, Paul B	Granville
3728	Whitfield, Arthur	Hawarden

SAC.

3445	Andre, T. J	Schaller
4710	Anderson, C. E	Odebolt
1182	Brimhall, C. W	Schaller
2811	Brown, Caleb	Sac City
3502	Brooks, W. R	Schaller
4062	Bieser, J. H	Odebolt
4847	Barkl, Charles E	Sac City
4363	Casavaw, George W	Sac City
4956	Cooke, S. R	Wall Lake
4920	Graham, J. W	Early
4955	Hopkins, C. M	Wall Lake
5098	Hannum, W. H	Early
3380	Kessler, Joseph	Auburn
5206	Petersmeyer, William	Odebolt
5135	Page, F. W	Wall Lake
3566	Rowe, E. E	Early
1014	Summerwill, William J	Odebolt
2197	Selby, R. W	Odebolt
2747	Sifford, Charles	Lake View
3410	Sherbundy, Byron	Sac City
3927	Smith, Cloid H	Odebolt
4541	Smale, Hubert	Sac City
4826	Sherrard, Leslie W	Sac City
4883	Searight, Frank	Sac City
4056	Williams, Albert J	Sac City

STORY.

2544	Aplin, Arthur S	Cambridge
958	Briggs, Samuel E	Nevada
2881	Bosworth, L. M	Ames
3177	Benedict, George	Maxwell
3767	Burke, N. W	Ames
3818	Bales, D. D	Ames
2859	Briggs, George H	Nevada
2792	Campbell, Charles E	Collins
4271	Carver, E. J	Colo
3849	Davendorf, W. A	Story City
4684	Erb, B. F	Cambridge
4806	Fellows, E. H	Cambridge
1463	Gandrup, W. D	Story City
3760	Graham, Robert D	Nevada
4376	Graves, Edwin H	Gilbert Station
2549	Hostetter, John I	Colo
4393	Hermanson, Theo. P	Roland
4772	Ingledue, E. C	Zearing
3644	Judisch, George	Ames
21[illegible]1	Lax, Fred	Colo
2858	Lande, Amos	Slater
4338	Loughran, Thomas J	Story City
4853	Persons, A. F	Maxwell
5054	Olinger, John W	Slater
4874	Shuttleworth, H. W	Nevada
5102	Shuttleworth, E. H	Nevada
3297	Thompson, R. K	McCallsburg
4359	Thomas, Charles H	Cambridge
3848	Wray, Walter L	Nevada
5033	Winans, Lewis P	Nevada

TAMA.

4000	Baker, Charles D	Toledo
1253	Coffin, Reuben M	Tama City
4750	Crossman, William P	Tama City
2891	Douglas, E. F	Dysart
3479	Grimm, W. H	Traer
4942	Gerard, S. A	Gladbrook
5084	Foster, Herbert E	Tama City
5306	Forester, G. W	Elberon
4405	Kullmer, John H	Dysart
4844	Kallem, James L	Chelsea
4963	Knudson, L. C	Montour
2191	Nauerth, J. H	Traer
4487	Reed, Charles G	Gladbrook
1949	Stiger, Stephen	Toledo
1252	Soleman, Henry	Tama City
3217	Springer, George L	Garwin
3961	Stevens, J. H	Montour
4741	Snyder, W. C	Tama City
4757	Shugart, N. K	Elberon
5011	Smith, L. B	Garwin
225	Welton, Hiram	Butlerville

TAYLOR.

8	Babson, James E	Blockton
2308	Bibbins, A. L	Bedford
2824	Bennett, Theo. W	Lenox
2524	Bucholz, Emil A	Gravity
1151	Childs, Horace A	Lenox
4138	Dunlavy, Henry F	Bedford
2565	Fritz, William I	Clearfield
1864	Golliday, A. M	Bedford
5080	Graff, George L	Bedford
4854	Hall, A. P	Blockton
2155	King, Albert E	Blockton
3739	Love, Charles	New Market
2318	McColm, J. T	Gravity
4613	Nelson, Charles N	Bedford
4836	Naiden, Walter J	Lenox
1376	Rhoades, H. B	Bedford
2387	Rockwell, Robert B	Bedford
4339	Roberts, Oren B	New Market
5067	Robbins, T. L	Clearfield
1635	Scroggs, J. P	Lenox
2563	Tyler, Oscar D	Lenox
3604	Wright, Frank	Conway
4214	Walker, John C	New Market

UNION.

4569	Aldrich, Ed. A	Creston
4671	Atkinson, George H	Creston
224	Bailey, A. S	Lorimer
3126	Biddinger, J. W	Afton
4992	Beerkle, John F	Creston
244	Cherry, J. W	Creston
2194	Christy, W. D	Shannon City
4095	Coltrane, N. B	Afton
3158	Foster, H. O	Creston
4302	Gose, K. E	Lorimer
4873	House, J. G	Afton
789	Johnston, R. H	Cromwell
1705	Kees, John	Creston
3636	Leach, James W	Creston
4282	McDaniel, Alonzo B	Afton
4872	McCune, Charles H	Shannon City
722	Norton, H. M	Kent
4121	Noel, John F	Creston
4222	Olinger, William	Thayer
4755	Reynolds, John W	Creston
2427	St. John, L. E	Shannon City
4290	Sullivan, Eugene F	Afton
5205	Shields, William M	Afton
3649	Walker, L. M	Afton

VAN BUREN.

1951	Blackman, B. P	Bonaparte
2975	Baker, Wm. S	Farmington
13	Cross, John T	Farmington
3897	Davis, Jas. P	Bonaparte
5047	DeFord, Perry	Cantril
3623	Franks, S. C	Farmington
4310	Hunter, J. W	Farmington
3785	Haslach, John A	Leando
4922	Jackson, T. C	Keosauqua
3065	Kick, Fred	Farmington
3627	McKibbon, W. A	Milton
310	Ragsdale, J. S	Birmingham
2876	Rice, John A	Milton
3777	Reininghaus, John E	Cantril
5220	Roberts, F. H	Keosauqua
680	Strickling, Jos. C	Keosauqua
869	Summers, L F	Milton
4426	Snyder, R. B	Keosauqua
3023	Underwood, Poe	Birmingham
3856	Wilson, Frank D	Bonaparte
4774	Warden, Harry E	Bonaparte

WAPELLO.

3546	Beck, W. R	Eldon
3715	Burns, Warren A	Ottumwa
5019	Butcher, John	Blakesburg
1607	Castle, Chas. A	Ottumwa
2775	Campbell, Lafayette	Chillicothe
3886	Clark, Frank B	Ottumwa
4229	Campbell, R. M	Ottumwa
4519	Campbell, M. D	Blakesburg
5007	Connelly, F. L	Agency
1008	Elliott, Wm. D	Ottumwa

WAPELLO—CONTINUED.

1415	Ennis, Wm. W	Ottumwa
993	Gephart, Arthur	Ottumwa
2704	Holtzschuherr, O. Van	Ottumwa
4108	Johnson, H. B.	Ottumwa
4516	Kiser, Theo	Ottumwa
3716	La Force, D. A.	Ottumwa
4588	Loring, John M	Ottumwa
3450	Mollison, W. Thede	Ottumwa
4606	Miller, Jas. A	Eddyville
5116	Moore, Ed. J	Eldon
5318	Mollison, Allen E	Ottumwa
5094	Orr, Alexander L	Eldon
1964	Pelham, W. S	Kirkville
4071	Phelp, C. W	Eldon
175	Reynolds, A. J	Agency
4970	Reynolds, A. L.	Ottumwa
4408	Russell, Chas. R	Ottumwa
1720	Scott, E. M. B	Ottumwa
2196	Sampson, J. W	Ottumwa
2981	Sampson, S. V	Agency
3540	Sargent, W. L	Ottumwa
3553	Snelson, Lula	Ottumwa
4800	Sheffer, Samuel F	Ottumwa
4804	Swenson, Julius H. L	Ottumwa
4756	Stephenson, Geo. E.	Eddyville
5076	Sloan, J. A	Ottumwa
4194	Taylor, Harry E	Ottumwa
1005	Taylor, Charles O	Ottumwa
994	Udell, A. S	Ottumwa
1062	Van de Ven, H	Ottumwa
2879	Wilson, J. E	Ottumwa
4517	Walker, Geo. L	Ottumwa

WARREN.

4352	Forrester, J. S	Indianola
3420	Husted, D. W	Indianola
4326	Irwin, Henry	Indianola
3441	Kessing, J. J	Cummings
1075	Marietta, J. C	Palmyra
62	Nunnally, L. B	Hartford
4039	Osborne, E. A	Indianola
4244	Ralston, S. A	Lacona
3295	Young, O P	Carlisle
3832	Waugh, Walter	Milo

WASHINGTON.

2061	Allen, B. F	Kalona
1984	Burroughs, J. R	Washington
5008	Bull, A. S	Wellman
1300	Chilcote, William E	Washington
1391	Cook, William A	Washington
2163	Critz, S. F	Riverside
3839	Campbell, B. C	Crawfordsville
4333	Carris, E. C	Washington
4881	Critz, J. P	Riverside
3459	Dosh, C. W	Brighton
1303	Glasgow, L. G	Washington
3664	Glasgow, James B	Washington
4009	Hochstetler, B. F	Kalona
3988	Israel, Mary	Brighton
3293	Longwell, Jessie	Wellman
2645	Ritter, John M	Kalona
3358	Stewart, Charles W	Washington
3105	Stewart, J H	Washington
4173	Sherman, D. B	Washington
528	Walker, W. A	Washington
4447	Wray, A. M	Kalona
5207	Watters, W. L	Wellman

WAYNE

4131	Ady, H. C	Humeston
2359	Bruner, D. M	Clio
1421	Clark, Eaton K	Seymour
3842	Downs, A. W	Seymour
1820	Hinkle, George W	Harvard
2288	King, Thomas F	Lineville
4905	Kidd, Fred Z	Allerton
3738	McCulloch, George	Humeston
4459	McCoy, John R	Seymour
4525	Morrison, Theo. L	Seymour
1878	Rankin, J. B	Allerton
526	Sproat, William S	Corydon
413	Zern, S. D	Corydon

WEBSTER.

4696	Brown, Harry E	Ft. Dodge
5255	Blanche, R. J	Ft. Dodge
3005	Cole, I. G	Dayton
3875	Cole, Charles F	Dayton
4275	Corey, C. S	Lehigh
4597	Delander, Charles A	Gowrie
4526	Dittmer, Adolf C. H	Ft. Dodge
63	Evans, John M	Gowrie
1645	Eslich, Thomas B	Lehigh
4545	Flaherty, John F	Ft. Dodge
2314	Gesell, C. L	Duncombe
4203	Gregg, Finley K	Badger
4477	Griffin, Horace M	Ft. Dodge
5236	Griffin, David J	Vincent
2665	Howey, Frank	Ft. Dodge
3245	Hine, J. B	Ft. Dodge
3975	Haire, Will W	Ft. Dodge
4273	Hood, E. J	Clare
5321	Hood, T. R	Clare
4708	Ketterer, George A	Gowrie
4816	Kehm, Conrad	Ft. Dodge
5117	Kuntson, George W	Callender
3854	Larsen, T. S	Ft. Dodge
5221	Lagerquist, V. N	Gowrie
2935	McNamara, John F	Ft. Dodge
4674	Maher, William F	Ft. Dodge
3903	Nordstrum, John F	Dayton
1939	Oleson, Olaf M	Ft Dodge
4814	Olive, Richard W	Harcourt
5060	Oard, Arthur W	Ft. Dodge
2381	Sackett, Robert W	Ft. Dodge
2907	Saunders, C. J	Clare
3675	Vauce, J. E	Gowrie
4812	Van Sickle, Clark	Callender
2825	Waldburger, J. C	Ft Dodge
4856	Walrod, Guy L	Beaman

WINNEBAGO.

5212	Cahill, J. L	Thompson
4107	Fletcher, Calvin T	Thompson
2361	Gardner, Henry C	Buffalo Center
4831	Helgeson, P. A	Lake Mills
2250	Koto, P. O	Forest City
2596	Keeler, Charles E	Lake Mills
5050	McKay, J. Harry	Buffalo Center
11	Nerby, Levi B	Lake Mills
4686	Nickson, J. D	Forest City
3299	Pinckney, P. A	Forest City
4698	Polson, Gustaf E.	Buffalo Center
4718	Sorenson, Peter R	Lake Mills
5180	Sarset, W. F.	Forest City
4793	Torgeson, Thomas C	Forest City
4897	Walters, C. M. C	Buffalo Center

WINNESHIEK.

5856	Allen, R. E.	Ridgeway
3128	Blanchaine, C. H	Ossian
4510	Brunt, Isaac W	Decorah
4899	Duncan, James H	Decorah
2884	Engbartson, Richard	Decorah
5189	Horton, C. D	Ft. Atkinson
4324	Isbell, Arthur	Calmar
1011	Mills, Charles J	Ossian
4403	Moline, Oscar G	Ridgeway
5114	Merritt, F. H	Ossian
4508	Parman, E. J	Calmar
4950	Qualey, Oluf	Ridgeway
1531	Riggs, Wm. K	Castalia
963	Scott, John	Calmar
3484	Strand, O. A	Decorah
5078	Sorenson, Albert J	Decorah
1733	Tower, Hannibal	Ft. Atkinson
632	Worth, Fordyce	Hesper
3494	Weiser, E. J	Decorah
3508	Wallender, Joseph	Calmar

WOODBURY.

1756	Arnold, Charles F	Sioux City
3456	Allen, S. A	Sioux City
4997	Andreen, Carl	Sioux City
3444	Blair, James E	Sioux City
2703	Beppler, J F	Sioux City
4062	Brooks, Harry A	Oto
4369	Backer, N. G	Hornick
2990	Crady, Ed. E	Sioux City
3549	Cummings, I. P	Sioux City
2919	Chadwick, John B	Salix
4389	Crain, W. L	Cushing
4918	Countermine, R. H	Sioux City
3642	Dewey, William H	Moville
4224	Dorr, O. H	Sionx City
3426	Franz, F W	Sioux City
3449	Guiney, Howard P	Sioux City
774	Hope, George T	Sioux City
1186	Hansen, F	Sioux City
2201	Henderson, H. C	Sioux City
3552	Haefner, Ernest C	Sioux City
5120	Harstad, Oliver	Sioux City
3144	Knos, Lars Peter	Sioux City
3555	Klise, J. F	Sioux City
4861	Kloster, Benjamin J	Sioux City
1386	Loucks, R. H	Danbury
1473	Lewis, Ed H	Sioux City
3489	Lander Will R	Sioux City
4865	Lundgren, Charles W	Sioux City
5292	Lerch, Fred, Jr	Sioux City
2569	Montross, George D	Sloan
2680	Marotz, F. W	Sergeants Bluffs
2993	Moore, Silas H	Sioux City
2994	Moore, Arthur J	Sioux City
3382	Mowrer, J. R	Sioux City
3670	Merrill, W. F	Sioux City
5313	Malone, Edmund	Sioux City
1472	Nash, A. F	Sioux City
4521	Nichols, C. Ellis	Sioux City
4878	O'Day, J. W	Danbury
1419	Rice, Charles	Smithland
1420	Rice, R. C	Smithland
3999	Rudy, J. W	Sioux City
4802	Rippey, J. H	Pierson
2385	Smith, Charles E	Correctionville
3042	Scherling, Gustav	Sioux City
3252	Schmidt, William F	Sioux City
4079	Surface, David U	Holly Springs
4153	Samuelson, J. A	Sioux City
4784	Smith, Fred N	Sioux City
4796	Soper, George M	Sioux City
4919	Strauss, Carl	Sioux City
5169	Southwick, Milton E	Moville
3439	Thompson, E. T	Sioux City
3487	Taylor, James F	Salix
3646	Thelander, C. C	Sioux City
3724	Teefey, Daniel	Anthon
4668	Thompson, Jos	Sioux City
2698	Yockey, C. C	Correctionville
4767	Young, John	Hornick
2204	Wright, W M	Correctionville
3561	Wasser, Lot E	Sioux City
4468	Wendell, Ed	Smithland

WORTH.

5266	Brown, Lewis O	Northwood
5101	Dillon, George W	Northwood
3363	Emery, George M	Northwood
4810	Frieberg, Emil L	Northwood
4419	Hansen, Adolph W	Northwood
5196	Gray, Hamilton E	Northwood
1836	Jones, J. R	Fertile
2518	Thorson, Nels	Northwood
4560	Swallow, George	Grafton
4963	Sanders, C. W	Manley
945	Wilson, O. R	Kensett

WRIGHT.

1725	Elliott, John A.	Clarion
4732	Edwards, J. E	Eagle Grove
3095	Frank, E S	Clarion
5182	Finn, G. W	Belmond
5216	Foley, O. L	Eagle Grove
3141	Harr, D. D.	Belmond
4484	Hamilton, L. C	Clarion
4618	Hills, F. N	Clarion
3598	Ingleson, Fritz E	Goldfield
3824	Kenefick, T. H	Belmond
2962	Mulnix, J. A.	Dows
3070	Morse, Charles H	Eagle Grove
3841	Mulnix, A. B	Dows
2462	Newman, E. P	Dows
3209	Nichols, W. E	Eagle Grove
4916	Nollett, Roy C	Clarion
2582	Parker, L. T	Eagle Grove
2591	Smallpaige, R. M	Eagle Grove
3765	Smallpaige, J. B	Eagle Grove
3601	Smith, Albert E	Eagle Grove
4236	Smith, J. C	Woolstock
4803	Stauffer, Will F	Eagle Grove
2693	Wills, F. J.	Eagle Grove
5024	Wood, Harry L	Eagle Grove

SYNOPSIS OF STATE PHARMACY REGISTER.

From last report, December 1, 1895, to November 1, 1897.

REGISTRATIONS, REVOCALS, FORFEITURES, ETC.

Number of examinations	723
Number of re-examinations	377
Total number of examinations	1,100

Of this number 406 have passed successful examinations and gold seal certificates have been granted them.

Registered as graduates		23
Number registered pharmacists who have died in two years	27	
Number certificates canceled on owner's request	22	
Number of certificates forfeited by law	18	
Total number of certificates revoked, canceled, forfeited and superseded (become void)		67
Number of certificates issued during same time Red seal	23	
Gold seal	406	
		429
Showing a gain in the two years of		362
Number of certificates in active force in the state as per last report, December 1, 1895		2,616
Number of certificates in force in the state November 1, 1897		2,836
Being 220 more November, 1, 1897, than at last report, December 1, 1895		220
Of the above 2,836 certificates in force November 1, 1897, there were in active business as proprietors		1,779
In active business as clerks		673
Total in active business		2,452
Proprietors and clerks out of business		384
		2,836
Registered assistants in active business	15	
Total number registered since passage of the pharmacy law to date		5,344

CERTIFICATE.

IOWA COMMISSIONERS OF PHARMACY,
OFFICE OF THE SECRETARY,
STATE CAPITOL, DES MOINES, IOWA.

I, Charles W. Phillips, secretary of the commissioners of pharmacy for the state of Iowa, hereby certify that the foregoing abstract of the state pharmacy register, is copied from the original register on file in this office, and that the same is true and correct.

In testimony whereof, I have hereunto set my hand and affixed seal of the commission, this 1st day of November, A. D. 1897.

[SEAL.] CHARLES W. PHILLIPS,
Secretary of the Commission.

[Reprint.]

OFFICIAL CIRCULAR OF THE COMMISSION OF PHARMACY.

(IN ACCORDANCE WITH THE CODE OF 1897.)

DES MOINES, OCTOBER 11, 1897.

[GOVERNING SALE OF PARIS GREEN.]

REGULATION No. 1.

The sales of Paris green (*i. e.*, arsenic and its preparations), being one of the poisons included in schedule A, section 2598, of chapter 18, should be entered in the poison register. It is, therefore, unlawful for any person except a registered pharmacist to retail the same for any purpose whatever.

[SALE OF VERMICIDES.]

REGULATION No. 2.

The sale of "Rough on Rats," or any vermicide containing poisons included in schedule A, section 2598, of chapter 18, should be entered on the poison register. It is, therefore, unlawful for any person except a registered pharmacist to retail the same for any purpose whatever.

[RELATING TO THE SALE OF HOMEOPATHIC MEDICINES.]

REGULATION No. 3.

The sale of homeopathic medicines (not proprietary) properly comes under the regulations of the pharmacy law. The sale, therefore, of any quantity of arsenic, aconite, nux vomica, belladonna and other poisonous preparations enumerated in sched-

ules A or B, section 2598, should be sold as herein required. A technical construction is warranted in the sale (except as provided in section 2598) of a single bottle of these remedies, notwithstanding the contents of an entire bottle proved harmless, as the purchase and use of several bottles of the same might prove fatal.

[PROPRIETARY MEDICINES CONTAINING POISON.]

REGULATION No. 4.

Under the provisions of chapter 18 of code of 1897, all proprietary medicines containing poisons can only be sold by registered pharmacists as provided by the pharmacy law and pharmacy regulations.

[PROPRIETARY MEDICINES CONTAINING INTOXICATING LIQUORS.]

REGULATION No. 5.

All *Bitters*, *Cordials*, *Elixirs*, *Wines*, *etc.*, put up in the form of proprietary medicines, that can be used as an intoxicant, can only be sold by persons authorized to sell intoxicating liquors, and then only in the same manner as any other intoxicating liquor, by requiring purchasers to apply as per form "E."

REGULATION No. 6.

The words, "*such other domestic remedies,*" as referred to in section 2588, chapter 18, code of 1897, are hereby construed to mean:

The so-called non-secret remedies. The law itself provides that same "*do not include any intoxicating liquors or poisons.*"

[RELATING TO ITINERANT LICENSES.]

REGULATION No. 7.

Section 2594, chapter 18, code of 1897, entirely governs the licensing of itinerant vendors of *appliances of any kind for the treatment of diseases or injury.* The words "any itinerant vendor," apply to *each* traveling agent or seller who travels from place to place selling such appliances, and not to the manufacturer, unless said manufacturer also acts as an itinerant vendor.

Licenses under this section are transferable for the unexpired term by the last owner of said license sending the same to the secretary for record of transfer and endorsement thereon.

[SUPERSEDING OF CERTIFCATE.]

REGULATION No. 8.

In all cases where registered pharmacists have two certificates of registration, the last certificate issued will supersede the former, and renewals will be required on it only.

[CANCELLATION OF CERTIFICATES FRAUDULENTLY OBTAINED.]

REGULATION No. 9.

When the Commissioners of Pharmacy have cause for believing any improper aid was made use of by registered pharmacists, who passed examination on answers subscribed under oath, they will summon such registered pharmacists before either one of the Commissioners, or the Board of Commissioners, for a supplementary examination to verify the papers upon which such decision of their competency was based; and if they fail to reasonably verify such original examination when notified, the Commissioners will cancel their certificates and will strike their name from the register. And all persons registered upon false representation, or by fraudulent means, will be stricken from the register whenever the Board receives notice of conviction, as per sections 2595 and 2596, chapter 18, code of 1897.

[REVOCATION OF CERTIFICATES ON TRANSCRIPT OF COURT RECORDS.]

REGULATION No. 10.

In all cases hereafter brought before the Commission of Pharmacy for the purpose of revoking certificates of registration, as provided in sections 2592 and 2593, chapter 18, code of 1897, when said cases are based on court records, the prosecution will be required to file with the secretary of this board certified copies of the same, showing final judgment of conviction under the law relating to the adulteration of drugs, chemicals and medicinal preparations, as provided in section 2592, or to the law relating to the retailing of poisons, as provided in section 2593 of chapter 18; and that the convicted parties be identified by giving the number of their certificate; whereupon written notice will be served on the convicted registered pharmacist to show cause in writing, if any, why his or her name should not be stricken from the State Pharmacy register, as provided by section 2596, chapter 18, code of 1897.

REGULATION No. 11.

Applicants for registration will be deemed "competent and fully qualified" as provided in section 2589, chapter 18, code of 1897, and entitled to certificate as registered pharmacists, when having at least two years' practical experience in a drug store or pharmacy; *provided*, that the actual time spent in a recognized college of pharmacy will be considered as practical experience, but no more than one year of such time will be allowed, or, if a graduate of a recognized medical college at least three years in the actual practice of medicine, and when upon examination only they shall have answered correctly seventy-five per cent (75 per cent) of questions in schedule submitted.

Applicants for registration under twenty-one years but not less than eighteen years of age, having had a practical experience of at least two years in a drug store or pharmacy, or college as above specified, who have upon examination given the same evidence of qualification, will be registered as assistant pharmacists and certificates issued accordingly; and said certificates of assistant pharmacists will, upon application, be exchanged for certificates of regular registration when the holders thereof shall have arrived at the age of twenty-one years.

[TIMES AND PLACE FOR EXAMINATIONS.]

REGULATION No. 12.

Examinations will be conducted at Des Moines, Oskaloosa and Hawarden on the first Tuesday of each month.

Blank applications can be obtained of either Commissioner or Secretary, and should be filed with the Commissioner before whom the applicant will appear, in advance of examination day.

[OFFICIAL FORMS.]

REGULATION No. 13.

In accordance with chapter 6, code of 1897, we have this day adopted the following official forms:

A.—Notice of Application for Permit.

B.—Petition for Permit.

C.—Bond.

D.—Permits to buy, keep and sell Intoxicating Liquors.

E.—Request of Purchasers. Series A. and B.

F.—Permit-holders' Record of Purchases, Sales and Uses.

G.—Permit-holders' Bi-monthly Statement to the County Auditor of Purchases, Sales and Uses.

H.—Permit-holders' Bi-monthly Report and Affidavit of Request.

[REGULATIONS TAKE EFFECT.]

REGULATION No. 14.

All pharmacy regulations to take effect and be in force in ten days after the date of their publication in the official circular of the Commissioners of Pharmacy.

JNO. H. PICKETT,
FLETCHER HOWARD,
W. L. LELAND,
Commissioners.

PHARMACY NOTICE.

No. 1.

For the purpose of facilitating the enforcement of the pharmacy law, the State has been districted, and the counties assigned to each of the Commissioners as follows. But applicants for examination can appear before either member of the Board:

TO COMMISSIONER J. H. PICKETT, OSKALOOSA—Adair, Adams, Appanoose, Cass, Clarke, Davis, Decatur, Des Moines, Fremont, Henry, Jefferson, Keokuk, Lee, Louisa, Lucas, Madison, Marion, Monroe, Montgomery, Mills, Muscatine, Mahaska, Page, Pottawattamie, Ringgold, Taylor, Union, Van Buren, Wapello, Warren, Washington, Wayne.

TO COMMISSIONER W. L. LELAND, HAWARDEN—Allamakee, Bremer, Buena Vista, Butler, Cerro Gordo, Cherokee, Chickasaw, Clay, Clayton, Dickinson, Emmet, Floyd, Flanklin, Fayette, Hancock, Howard, Humboldt, Kossuth, Lyon, Osceola, Mitchell, Palo Alto, Pocahontas, Plymouth, Sioux, Winnebago, Winneshiek, Woodbury, Worth, Wright.

TO COMMISSIONER FLETCHER HOWARD, DES MOINES—Audubon, Benton, Black Hawk, Boone, Buchanan, Calhoun, Carroll, Cedar, Clinton, Crawford, Dallas, Delaware, Dubuque, Greene, Grundy, Guthrie, Hamilton, Hardin, Harrison, Ida, Iowa, Jackson, Jasper, Johnson, Jones, Linn, Marshall, Monona, Polk, Poweshiek, Sac, Scott, Shelby, Story, Tama, Webster.

COMMISSIONERS NOTICE.

Before correspondents write for opinions they should first study the law, regulations and decisions, as compiled and published by the Board, and then make separate specific statements of facts, and not expect opinions on general statements.

N. B.—It may not occur to registered pharmacists the amount of time it takes in looking up the records of a registered pharmacist without having the number of his certificate, as well as the difficulty sometimes in identifying his name without his number. It is impossible to keep a correct alphabetical list of names, owing to the constant change, some names retiring and new names being added. When we have the number of a certificate we can turn to the records in a moment on the numerical list.

Having frequently made the request heretofore, we again earnestly request all registered pharmacists when corresponding or desiring any matters of information from this office to give the number of their certificates with their names.

SPECIAL NOTICES.

The Commissioners desire to call the attention of all registered pharmacists to some of the important points of the law.

First.—That none but registered pharmacists can conduct a drug store or pharmacy; they must be the principals and managers of the store in *all its management*; neither can they allow anyone not registered to sell medicines or poisons, or dispense physicians' prescriptions, except under their direct supervision. (See Supreme Court decision, *State v. Norton.*)

Second —Sales of medicines and poisons can only be made by a proprietor, principal or clerk who is a registered pharmacist, and who is required to keep a record of all poisons sold, included in schedule A and regulations.

Third.—The certificates of all registered pharmacists must be conspicuously posted in the place of business or pharmacy which they are conducting, or in which they are employed, with the renewal certificate placed in the lower left hand corner and change of locality certificate (if they have changed their locality) in lower right hand corner of each certificate, to show to the public that their certificate of registration is in full force and effect.

Fourth.—All registered pharmacists when they change their locality are required to notify the Secretary of the Commission, and have their change of locality recorded, otherwise they are liable to a fine for each month's delinquency, and when so delinquent their certificates are not in full force and effect.

Fifth.—A registered pharmacist's certificate is regarded "*in full force and effect,*" when he holds a renewal of his certificate from March 22d to March 22d of the current year, and change of locality certificate if he has changed his location, unless subsequently forfeited and revoked. (See opinion of Attorney-General.)

WHEREAS, Annual renewals are not required or issued for the first part of a year preceding the 22d day of March, the pharmacist's certificate of registration is evidence that it is in full force and effect from the date of its issuance to the following 22d day of March; however, the certified statement up to date of the Secretary of the Commission of Pharmacy, under official seal of said Commission, is regarded the best legal evidence as to whether a person is registered or not.

Sixth.—Registered pharmacists are exempt from jury duty (See section 383, code of 1897.)

JNO. H PICKETT,
FLETCHER HOWARD,
W. L. LELAND,
Commissioners

[TAKEN FROM THE CODE OF 1897.]

CHAPTER 6.

TO REGULATE THE KEEPING AND SALE OF INTOXICATING LIQUORS BY REGISTERED PHARMACISTS.

SEC. 2385. **Permits.** Persons holding permits may sell and dispense intoxicating liquors, not including malt liquors for pharmaceutical and medical purposes, and to permit holders for use and resale by them, only for the purposes authorized in this chapter; they may also sell and dispense alcohol for specified chemical and mechanical purposes, and wine for sacramental uses. Registered pharmacists, physicians holding certificates from the state board of medical examiners and manufacturers of proprietary medicines may buy from permit holders intoxicating liquors (not including malt) for the purpose of compounding medicines, tinctures and extracts that can not be used as a beverage, but nothing herein contained shall be construed to authorize the manufacture or sale of any preparation or compound, under any name, form or device, which may be used as a beverage, and which is intoxicating in its character.

SEC. 2386. **Pharmacists—manufacturers of proprietary medicines.** If any such registered pharmacist or manufacturer of proprietary medicines shall sell, barter, give, exchange, dispose of or use intoxicating liquors in any manner or for any purpose other than authorized in the preceding section, he shall be liable to all the penalties and proceedings provided for in this chapter, and, upon proof of such violation by a registered pharmacist, the clerk of the district or superior court shall transmit to the commissioners of pharmacy a certified copy of the record thereof within ten days after its entry, and upon receipt of such certified copy said commissioners shall strike his name from the list of registered pharmacists and cancel his certificate. The commissioners of pharmacy are empowered to make such further rules and regulations, not inconsistent with law, with respect to the purchase, keeping and use of intoxicating liquors by registered pharmacists and manufacturers of proprietary medicines, as they shall think proper to prevent abuses of the privilege, and shall revoke the certificate of registration of any pharmacist for repeated violations of this chapter. Said commissioners are authorized to draw from the state treasury an amount not exceeding fifty per cent of the clear proceeds of all fees collected and paid into the treasury of any county on account of violations of the provisions of this chapter or the chapter regulating the practice of pharmacy, prosecuted by the commissioners, the amount so drawn to be used solely in prosecutions instituted by them for failure to comply with the provisions of such chapters. The court or clerk thereof, before whom any prosecution is instituted or prosecuted by the commissioners of pharmacy, shall certify to the auditor of state all such cases, and the amount of fees imposed and collected therein. The expenses thus incurred by the commission shall be audited by the executive council, and the amount thereof shall be drawn from time to time upon the warrants of the state auditor.

SEC. 2387. **Application for permit.** All applications for a permit to sell intoxicating liquors for the purposes allowed in this chapter shall be by petition, signed and sworn to by the applicant, and filed in the office of the clerk of the district or superior court of the county or city in which the buying and selling is to be carried on, at least ten days before the term at which the matter is to be for trial, which petition shall set out the name of the applicant, his residence and business and that for the two previous years, the place, particularly describing it, where the business is to be conducted, that he is a citizen of the United States and of this state, that he is a registered pharmacist, that now and for the six months last past he has been lawfully conducting a pharmacy in the township, town or city wherein he proposes to engage in the business under the permit applied for, that he has not been adjudged guilty of any violation of the law relating to intoxicating liquors within the two years next preceding the making of his application, is not the keeper of a hotel, eating house, saloon, restaurant or place of public amusement, and that he is not addicted to the use of intoxicating liquors as a beverage, and desires a permit to buy, keep and sell liquors for lawful purposes only. If the applicant has previously held a permit which has been revoked, his petition, in addition to the foregoing requirements, shall state that he has not, within the last two years next before making the application, knowingly been engaged, employed or interested in the unlawful manufacture, sale or keeping with intent to sell of intoxicating liquors.

SEC. **2388. Notice.** Notice of an application for a permit must be published for three consecutive weeks in a newspaper regularly published and printed in the English language, and of general circulation in the township, town or city where the applicant proposes to conduct the business, or, if none be regularly published therein, then in one of the papers selected by the board of supervisors for the publication of its proceedings, the last publication of which shall be not less than ten nor more than twenty days before the first day of the term at which the hearing is to be had. This notice shall state the name of the applicant, with the firm name, if any, under which he is doing business, the purpose of the application, the particular location of the place where the proposed business is to be carried on, and that the required petition is or will be on file in the clerk's office of the court (naming it) at least ten days before the first day of the term (naming it) when the application will be made. A copy of such notice shall be served upon the county attorney in the same manner and for the same length of time as is required of original notices in said courts.

SEC. **2389. Hearing—remonstrances.** Upon the return day of the notice, the court having, from an inspection of the record, ascertained that due and timely service thereof has been made, shall, if no remonstrance has been or is offered to be filed, unless for cause postponed to some other day in the term, proceed to hear and try the application. Any remonstrance against or objection to the granting of the permit must be in writing and filed in the clerk's office by noon of the first day of the term, unless further time be given, and shall be so filed before the date fixed for the trial. Such remonstrance or objections may be made by any citizen of the county wherein the application is made, specifically stating the reasons therefor, and the court shall fix a day in the term for the trial, and all applications shall be tried at the first term after completed service has been made of the required notice, if the business of the court shall allow. No permit shall be granted unless the court shall find from competent evidence that all the averments in the petition are true, that the reasonable convenience and necessities of the people, considering the population and all the surroundings, make the granting of the permit proper, and that the applicant is possessed of the character and qualifications required, worthy of the trust to be reposed in him, and likely to discharge the same with fidelity. The county attorney shall appear in such cases, and any number of persons, not less than five, filing any remonstrance or objection, may also appear by counsel and resist the application. If more than one permit is applied for in the same locality, the applications shall be heard at the same time, unless for cause shown it be otherwise ordered. If for any reason the application can not be tried in term time, the same may be heard by the judge in vacation, at a time to be fixed by the court and made of record, and in all applications for permits the court may grant or refuse any or all applications, as will best subserve the public good.

Sec. 2390. Bond. No permit shall issue until the applicant shall execute to the state a bond in the penal sum of one thousand dollars, with good and sufficient sureties to be approved by the clerk of the court, conditioned that he will well and truly observe and obey the laws of the state now or hereafter in force in relation to the sale of intoxicating liquors, that he will pay all fines, penalties, damages and costs that may be assessed or recovered against him for a violation of such laws during the time for which the permit is granted, and the principal and sureties in said bond shall be liable thereon, jointly and severally, for all civil damages and costs that may be recovered against the principal in any action brought by a wife, child, parent, guardian, employer or other person under the provisions of this chapter. The bond, after being approved by the clerk, shall be deposited with the county auditor, and suit may be brought thereon at any time by the county attorney, or by any person for whose benefit the same is given. The clear proceeds of all other money which may be collected for breaches of the bond shall go to the school fund of the county. If at any time the sureties on the bond shall file with the court or clerk a written request for release, or become insolvent, or be deemed insufficient by the court granting the permit, or its clerk, such court or clerk shall require a new bond to be executed within a reasonable time to be fixed. If the permit holder fails or neglects to furnish a new bond within the time so fixed, the permit shall from that date become null and void.

Sec. 2391. Oath of applicant. In addition to giving the bond required, the applicant shall take and subscribe the following oath, which shall be indorsed upon the bond: "I,........, do solemnly swear (or affirm) that I will well and truly perform all and singular the conditions of the within bond, and keep and perform the trust confided in me to purchase, keep and sell intoxicating liquors. I will not sell, give or furnish to any person any intoxicating liquors otherwise than as provided by law, and especially I will not sell or furnish any intoxicating liquors to any person who is not known to me personally, or duly identified, nor to any minor, intoxicated person, or persons who are in the habit of becoming intoxicated; and I will make true, full and accurate returns of all certificates and requests made to or received by me as required by law; and said returns shall show every sale and delivery of such liquors made by me, or for me, during the months embraced therein, and the true signature to every request received and granted; and such returns shall show all the intoxicating liquors sold or delivered to any and every person, as returned."

SEC. **2392. Permit issued.** Upon taking said oath and filing said bond, the clerk of the court granting the same shall issue a permit to the applicant, authorizing him to keep and sell intoxicating liquors as in this chapter provided. The permit so issued shall specify the building, give the street and number or location in which intoxicating liquors may be sold by virtue of the same, and the length of time the same shall be in force, unless sooner revoked.

SEC. **2393. Record—costs.** The clerk of the court granting the permit shall preserve as a part of the record and files in his office, all petitions, bonds and other papers pertaining to the granting or revocation of permits, and keep suitable books in which bonds and permits shall be recorded. The books shall be furnished by the county like other public records. Whether said permit be granted or refused, the applicant shall pay the costs incurred in the case, and when granted, he shall make payment before any permit issue, except the court may tax the cost of any witnesses summoned by private persons resisting said application, and the fees for serving such subpœnas, to such persons, when it is shown that such witnesses were summoned maliciously, or without probable cause to believe their evidence material. The fees in such cases shall be as provided in actions at law in the district court.

SEC. **2394. Requests to purchase.** Before selling or delivering any intoxicating liquors to any person, a request must be signed by the applicant, in his true name, truly dated, stating the applicant is not a minor, his residence, for whom and whose use the liquor is required, and his true name and residence, and, where numbered, by street and number if in a city, the amount and kind required, the actual purpose for which the request is made, and for what use desired, and that neither the applicant nor the person for whose use requested habitually uses intoxicating liquors as a beverage, and attested by the permit holder who receives and fills the request. The request shall be refused unless the permit holder has reason to believe the statement to be true, and in no case granted unless the permit holder filling it personally knows the person applying is not a minor, intoxicated, nor in the habit of using intoxicating liquors as a beverage; or, if the applicant is not so personally known, before filling the order or delivering the liquor, he shall require identification, and the statement in writing of a reliable and trustworthy person, of good character and habits, known personally to him, that the applicant is not a minor, nor in the habit of using intoxicating liquors as a beverage, and is worthy of credit as to the truthfulness of the statements in the application; and this statement so made shall be signed by the witness in his own name, stating his residence correctly.

SEC. 2395. **Penalties.** If any person shall make any false or fictitious signature, or sign any name other than his own to any paper required to be signed, or make any false statement in any paper or application signed to procure liquors, the person so offending shall be punished by a fine of not less than twenty dollars nor more than one hundred dollars and costs of prosecution, and shall be committed until said fine and costs are paid, or shall be imprisoned not less than ten nor more than thirty days. If any permit holder or his clerk shall make false oath touching any matter required to be sworn to, the person so offending shall be punished as provided by law for perjury. If any person holding a permit under this chapter shall purchase or procure any intoxicating liquor otherwise than as herein authorized, or make any false return to the county auditor, or use any request for liquors for more than one sale, he shall be guilty of a misdemeanor and punished accordingly.

SEC. 2396. **Transportation by permit holder.** Every permit holder is hereby authorized to ship to registered pharmacists and manufacturers of proprietary medicines intoxicating liquors to be used by them for the purposes authorized by law. All railway, transportation and express companies and other common carriers are authorized to receive and transport the same upon presentation of a certificate from the clerk of the district or superior court of the county where the permit holder resides, that such person is permitted to ship intoxicating liquors under the law of this state.

SEC. **2397. Returns by permit holder.** On or before the fifteenth day of January, March, May, July, September and November of each year each permit holder shall make full returns to the county auditor under oath, of all requests filled by him and his clerks during the two preceding months, which oath shall be in the following form: "I, ...being duly sworn, on oath state that the requests for liquors herewith returned are all that were received and filled at my pharmacy (or place of business) during the months of.........., A. D....; that I have carefully preserved the same, and that they were filled up, signed and attested at the date shown hereon, as provided by law; that said requests were filled by delivering the quantity and kinds of liquors required, and that no liquors have been sold or dispensed under color of my permit during said months except as shown by the requests herewith returned, and that I have faithfully observed and complied with the conditions of my bond and oath taken by me thereon indorsed, and with all the laws relating to any duties in the premises.

SEC. **2398. Account of purchases and sales.** Every permit holder shall keep strict account of all liquors purchased or procured by him in a book kept for that purpose, which shall be subject at all times to the inspection of the commissioners of pharmacy, the county attorney, any grand juror, sheriff or justice of the peace of the county, and such book shall show of whom such liquors were purchased or procured, the amount and kind, the date of receipt and amount sold; also the amount on hand of each kind for each two months, and at the same time he returns requests to the county auditor he shall file a statement of such account with such auditor, except that the items of sales need not be embraced therein, but the aggregate amount of each kind shall be, and such statement shall be verified. All forms necessary to carry out the provisions of this chapter not otherwise provided for shall be as may be provided by the commissioners of pharmacy.

SEC. **2399. Illegal sales by permit holder – evidence.** Every permit holder or his clerk shall be subject to all the penalties, forfeitures and judgments, and may be prosecuted by all the proceedings and actions criminal and civil, whether at law or in equity, provided for or authorized by this chapter, and the permit shall not shield any person who abuses the trust imposed by it or violates the law. In case of conviction in any proceeding, civil or criminal, the liquors in possession of the permit holder shall by order of the court be destroyed, and on the trial of an action or proceeding against any person for manufacturing, selling, giving away or keeping with intent to sell intoxicating liquors in violation of law, or for any failure to comply with the conditions or duties imposed by law, the requests for liquors and returns made to the auditor, the quantity and kinds of liquors sold, or kept, purchased or disposed of, the purpose for which liquors were obtained by or from him and for which they were used, the character and habits of sobriety or otherwise of the purchasers, shall be competent evidence, and may be considered, so far as applicable to the particular case, with any other recognized, competent and material facts and circumstances bearing on the issues involved in determining the ultimate facts. In any suit, prosecution or proceeding under this chapter the court shall compel the production in evidence of any books or papers required to be kept, and shall compel any permit holder, his clerk, or any person who has purchased liquors of either of them, to appear and give evidence, but such oral evidence shall not be used against such person or witness on the trial of any criminal proceeding against him.

SEC. 2400. **Revocation of permit.** Permits shall be deemed trusts reposed in the recipients, and may be revoked upon sufficient showing by order of a court or judge. Complaint may be presented at any time to the district or superior court, or a judge thereof, which shall be in writing and signed and sworn to by three citizens of the county in which the permit was granted. A copy of the complaint shall, with a notice in writing of the time and place of hearing, be served on the accused five days before the hearing, and if the complaint is sufficient, and the accused appear and deny the same, the court or judge shall proceed without delay, unless continued for cause, to hear and determine the controversy. If continued or appealed at the instance of the permit holder, his permit may, in the discretion of the court, be suspended pending the controversy. The complainant and accused may be heard in person or by counsel, or both, and proofs may be offered by the parties; and if it shall appear upon such hearing that the accused has in any way abused the trust, or that liquors are sold by the accused or his employes in violation of law, or dispensed unlawfully, or he has in any proceeding, civil or criminal, since receiving his permit, been adjudged guilty of violating any of the provisions of this chapter, the court or judge shall revoke and set aside the permit; the papers and order in such case shall be immediately returned to and filed by the clerk of the court, and, if heard by a judge, the order shall be entered of record as if made in court; and if in this or any other proceeding, civil or criminal, it shall be adjudged by the court or judge that any registered pharmacist, proprietor or clerk, has been guilty of violating any provision of this chapter, such adjudication may be by the commissioners of pharmacy regarded as sufficient, if repeated, to work a forfeiture of his certificate of registration. It shall be the duty of the clerk to forward to the commissioners of pharmacy transcripts of such judgments or orders without charge therefor, and as soon as practicable after final judgment or order has been made and entered.

SEC. 2401. **How business conducted—clerks—physicians.** A permit holder may employ not more than two registered pharmacists as clerks to sell intoxicating liquors in conformity to the permit and the law; but in such cases the acts of clerks in conducting the business shall be considered the acts of the permit holder, who shall be liable therefor as if he had personally done them, and in making returns, the verification of such requests as may have been received, attested and filled by the clerk must be made by such clerk, and the clerk who transacted any of the business under the permit must join in the general oath required of the employer, so far as relates to his own connection therewith. If for any cause a registered pharmacist who holds a permit shall cease to hold a valid and subsisting certificate of registration or renewal thereof, his permit shall be forfeited and be null and void. Nothing contained in this chapter shall be construed to prevent licensed physicians from in good faith dispensing liquors as medicines to patients actually sick and under their treatment. In case a permit holder shall die, his personal or legal representative may continue the business, subject to the provisions hereof, through the agency of any reputable registered pharmacist, upon the approval of the court granting such permit, or the clerk thereof, and the giving of a bond as hereinbefore provided.

SEC. 2402. **Intoxication punished.** If any person shall be found in a state of intoxication he is guilty of a misdemeanor, and any peace officer shall, without a warrant, take him into custody and detain him in some suitable place until an information can be made before a magistrate, and a warrant of arrest issued, under which he shall at once be taken before the magistrate issuing the same, or, if for any reason he cannot act, to the next nearest one, where he shall be tried, and, if found guilty, shall be fined in the sum of not less than five nor more than twenty-five dollars and costs of prosecution, or imprisoned in the county jail not more than thirty days. The penalty, or any portion of it, may be remitted by the magistrate before whom the trial is had, and the accused discharged from custody, upon his giving information in writing and under oath, stating when, where and of whom he purchased or received the liquor which produced the intoxication, and the kind and character of this liquor, and, in addition, giving bail for his appearance before any court to give evidence in any action or complaint to be commenced or preferred against such party for furnishing the same.

SEC. 2403. **Selling or giving to minor or intoxicated person or person in the habit of becoming intoxicated.** No person by himself, agent or otherwise, shall sell or give any intoxicating liquors to any minor for any purpose, except upon written order of his parent, guardian or family physician, or sell the same to any intoxicated person or one in the habit of becoming intoxicated. Any person violating the provisions of this section shall forfeit and pay the sum of one hundred dollars, to be collected by action against him, or, if a permit holder, against him and the sureties on his bond. Such action may be brought by any citizen of the county. One-half of the amount so collected shall go to the informer and one-half to the school fund of the county.

* * * * *

SEC. 2432. **Payment of mulct tax.** Any permit holder selling intoxicating liquors as a beverage shall pay the tax provided for in this section.

CHAPTER 18.

OF PRACTICE OF PHARMACY.

SECTION 2584. **Commissioners—powers.** The commission of pharmacy shall consist of three competent pharmacists who have been for the preceding five years residents of the state and engaged in practicing pharmacy, one of whom shall be annually appointed by the governor and hold office for three years and until his successor is appointed and qualified. The commission shall have power to make all needed regulations for its government and for the proper discharge of its duties under this chapter, the same to be done without expense to the state, save the necessary blanks and stationery, which shall, upon requisition, be furnished by the secretary of state, and make such other regulations not inconsistent with law and as authorized in this code, respecting the purchase, keeping and use of intoxicating liquors by registered pharmacists, not permit holders, as may be required for the prevention or abuse of the trust reposed in them, and such other matters as may be hereinafter specifically enumerated.

SEC. 2585. **Secretary and treasurer.** The commissioners of pharmacy shall annually, on the first Monday in May, elect a suitable person, who shall not be a member of said board, and who shall be known as secretary and treasurer; said secretary and treasurer shall enter upon the discharge of his duties as soon as he shall have filed with the secretary of state a good and sufficient bond in the penal sum of three thousand dollars, signed by at least two sureties, who shall justify in the aggregate to double the amount of said bond, and which shall bear upon its face the approval of the governor. The salary of said secretary and treasurer shall not exceed fifteen hundred dollars per annum.

SEC. 2586. **License fees.** The secretary and treasurer shall keep in his office a book known as the "commissioners of pharmacy license fee book," which shall be made with ruled columns and printed headings, showing the date, the name of the person paying, and the amount of each license and fee paid, in which he shall enter all fees for licenses received by him, and on the first Monday of each month he shall file with the auditor of state a true statement thereof for the previous month, properly sworn to by him, and shall quarterly pay into the state treasury, on the first day of January, April, July and October of each year, the amount of license fees payable by law into such treasury.

SEC. 2587. **Records—compensation.** The books, accounts, vouchers and funds belonging to or kept by said board of pharmacy shall at all times be open or subject to the inspection of the governor, or any committee appointed by him. Each commissioner of pharmacy shall receive as full compensation for his services the sum of five dollars for each day actually employed in the discharge of his official duties, together with his actual traveling expenses in performing said duties, all of which shall be paid from the fees of the office, and each commissioner shall file with the auditor of state, at the end of each quarter of his official year, an itemized statement under oath of his actual time in days employed in the discharge of his duty and traveling expenses incurred in the performance of his duty for such quarter.

SEC. 2588. **Registered pharmacists.** No person not a registered pharmacist shall conduct the business of selling at retail, compounding or dispensing drugs, medicines or poisons, or chemicals for medicinal use, or compounding or dispensing physicians' prescriptions as a pharmacist, nor to allow anyone who is not a registered pharmacist to so sell, compound or dispense such drugs, medicines, poisons or chemicals, or physicians' prescriptions; except such as are assistants to and under the supervision of one who is a registered pharmacist, and physicians who dispense their own prescriptions only; but no one shall be prohibited by anything contained in this chapter from keeping and selling proprietary medicines and such other domestic remedies as do not contain intoxicating liquors or poisons, nor from selling concentrated lye or potash having written or printed on the package or parcel its true name and the word "poison," sales of which need not be registered. Whoever violates either provision of this section, for the former shall pay five dollars for each day of its violation, to be recovered in an action in the name of the state, brought by the county attorney under the direction of the commission, and for the latter shall be guilty of a misdemeanor, and punished accordingly. In actions or prosecutions under this chapter, it need not be proven that the defendant has not a pharmacist's certificate, but such fact shall be a matter of defense.

SEC. 2589. **Examinations—registration.** The commission, at such times and places as it may select, and in such manner as it may determine upon, shall examine all persons desiring to engage in and conduct business as registered pharmacists, as contemplated in the preceding section, and, if found competent, the applicant's name shall be entered in the registry book of certificate holders. Graduates of pharmacy holding a diploma from the university, or an incorporated school or college which requires a practical experience in pharmacy of not less than four years before granting such diploma, may be registered without examination. Pharmacists thus registered have the sole right to keep and sell all medicines and poisons except intoxicating liquors.

SEC. 2590. **Registration and examination fees.** Each person furnished a certificate and registered without examination shall pay to the commission two dollars, and each and every person whom they examine orally, or whose answers to a schedule of questions are returned subscribed to under oath, the sum of five dollars, which shall be in full for all services. And in case the examination of said person shall prove defective and unsatisfactory, and his name not be registered, he shall be permitted to present himself for reëxamination within any period not exceeding twelve months next thereafter, and no charge shall be made for reëxamination. The said commissioners are authorized to administer oaths pertaining to their said office and take and certify the acknowledgments of instruments in writing. After registration, an annual fee of one dollar for a renewal certificate shall be paid on or before the twenty-second day of March by all pharmacists who continue in business, and the conduct of such business without such renewal shall be a misdemeanor.

SEC. 2591. **Registry book—certificate displayed.** The commission shall keep a registry book in which shall be recorded the names and places of residence of all certificate holders, with the date of such certificate, which shall hold good for one year, and no longer without renewal. Renewals shall be granted upon the payment of the annual fee fixed in the preceding section. Should a certificate holder change his residence, upon notice thereof such change shall be noted in the registry book. Each certificate holder shall keep displayed in his place of business his registration certificate. A failure to comply with this requirement shall be a misdemeanor.

SEC. 2592. **Sale of adulterated drugs.** Registered pharmacists shall be responsible for the quality of all drugs, chemicals and medicines which they may sell or dispense, except those sold in the original packages of the manufacturer, and those known as patent medicines. If any such pharmacist shall knowingly adulterate or cause to be adulterated any drugs, chemicals or medical preparations by him kept for sale or sold, he shall be guilty of a misdemeanor.

Sec. 2593. Sale of poisons. No person shall sell at retail any poisons enumerated in schedules A and B, except in dispensing poisons in usual quantities or doses upon the prescription of a physician as follows: Schedule A, arsenic and its preparations, corrosive sublimate, white precipitate, red precipitate, biniodide of mercury, cyanide of potassium, hydrocyanic acid, strychnia and other poisonous vegetable alkaloids and their salts, essential oil of bitter almonds, opium and its preparations except paregoric and other preparations of opium containing less than two grains to the ounce. Schedule B, aconite, belladonna, colchicum, conium, nux vomica, henbane, savin, ergot, cotton root, cantharides, creosote, digitalis, and the pharmaceutical preparations, croton oil, chloroform, chloral hydrate, sulphate of zinc, mineral acids, carbolic acid and oxalic acid; unless the package containing such poisons has placed thereon, and also on the outside wrapper or cover, the name of the article, the word "poison" and the name and place of business of the seller; nor sell or deliver such poison unless upon due inquiry it be found that the party receiving it is aware of its character and represents it is to be used for proper purposes; nor sell or deliver any of the poisons included in schedule A without also, before delivery of the same, causing an entry to be made in a book kept for that purpose, of the date of sale, the name and address of the purchaser, the name of the poison, the purpose for which it was represented to be required, and the name of the dispenser, which book shall be open to inspection by the proper authorities and preserved for at least five years, the entry of each such sale to be signed by the dispenser. Any person violating any of the provisions of this section, except as otherwise provided by law, shall be adjudged guilty of a misdemeanor and be punished by a fine of not less than twenty-five dollars nor more than one hundred dollars, or by imprisonment in the county jail for not less than thirty days nor more than sixty days, or by both fine and imprisonment, in the discretion of the court.

Sec. 2594. Itinerant vendors of drugs. Any itinerant vendor of any drug, nostrum, ointment, or appliance of any kind for the treatment of any disease or injury, and all those who by any method publicly profess to treat or cure diseases, injury, or deformity, shall pay to the treasurer of the commission of pharmacy an annual fee of one hundred dollars, upon the receipt of which the secretary of the commission shall issue a license for one year from its date. Two thousand dollars annually of the money arising from the license fund, or so much as may be needed, shall be devoted to defraying the expenses of the commission, and any balance remaining shall be paid into the state treasury. Said commission shall, on the first day of January of each year, make a verified and itemized statement in writing to the auditor of state, of all receipts and expenditures of money coming into their hands by virtue of their office. Any violation of this section shall be a misdemeanor, and any person shall, upon conviction thereof, pay a fine of not less than one hundred dollars, nor more than two hundred dollars. In actions or prosecutions under this chapter, it need not be proven that the defendant has not a license, but such fact shall be a matter of defense.

SEC. 2595. **Penalty for false representation.** If any person shall procure or attempt to procure a certificate of registry for himself or another by means of false representations or device, or without being a registered pharmacist shall conduct a place for retailing, compounding or dispensing drugs, medicines or chemicals, or for compounding or dispensing physicians' prescriptions, or shall use or exhibit the title of registered pharmacist, and each several day a place shall be so used shall be held to be a separate and several offense.

SEC. 2596. **Revocation of certificate.** When a registered pharmacist has been convicted of a violation of the provisions of this chapter, in addition to the other penalties provided by law, the commission, in its discretion, may revoke his certificate of registry.

OFFICIAL FORMS.

In accordance with Chapter 6, Code of 1897, adopted October 11, 1897. (See Regulation No. 13.)

[OFFICIAL FORM A.]

PUBLICATION NOTICE OF APPLICATION FOR PERMIT.

In the District (or Superior) Court of the State of Iowa..............County (or City).

In the matter of the application of .... a registered pharmacist, for a permit to buy, keep and sell intoxicating liquor.	........Term, 189..

NOTICE.

To Whom it May Concern: Notice is hereby given that the application of the undersigned...............a Registered Pharmacist, No.....doing business under the firm name of............., of............, in county of ...., State of Iowa, praying for a permit to buy, keep and sell intoxicating liquors (*particularly describe the locality*)........................ in county of........, State of Iowa, will be on file in the office of the Clerk of the District (or Superior) Court of said county (or city) on or before the ....day of......, 189.., and that said cause will come on for hearing in said court at the.......term of said court, to be begun and held at............., on the....day of......, 189... ...., *Applicant.*

[OFFICIAL FORM B]

PETITION FOR PERMIT.

In the District (or Superior) Court of the State of Iowa, in and for............ County (or City).

In the matter of the application of.................. a Registered Pharmacist, to buy, keep and sell intoxicating liquors. } ....Term, 189..

Comes now.................., a Registered Pharmacist, and prays that he be granted a permit to buy, keep and sell intoxicating liquors for lawful purposes, at the place hereinafter designated, and in support of this petition, alleges:

1st. That he is a citizen of the United States, the State of Iowa, and a resident of......county, that he is now engaged in the business of......and for the two years next prior to the filing of thispetition he has been engaged in the business of........, that he is a Registered Pharmacist No......, of the State of Iowa, doing business under the firm name of.........., that his certificate of Registration is in full force and effect for the town of........ and that he is now and for the last six months has been lawfully conducting a pharmacy in........township (*or town of*........), in the county of...... and State of Iowa, as proprietor of such pharmacy, and that he has not been adjudged guilty of violating the laws relating to intoxicating liquors within the last year next preceding the filing of this petition, that he is not the keeper of a hotel, eating house, saloon, restaurant or place of public amusement, that he is notaddicted to the use of intoxicating liquors as a beverage, and that he desires a permit to purchase, keep and sell such liquors for lawful purposes only, and that said business is to be conducted at........... Iowa, No....., street (or) lot............, (block) ....in said.......... county. ...., *Applicant.*

STATE OF IOWA,
...............COUNTY. }

I, ..., first being duly sworn depose and say that I am the applicant named in the foregoing petition, that I have read the foregoing, my petition herein, and know the contents thereof, and that all the allegations thereof are true as I verily believe.

....

Subscribed in my presence and sworn to before me by the said................, on this...........day of..............., A. D. 189..

.........................., *Notary Public.*

[OFFICIAL FORM C.]

BOND.

Know all men by these presents, that we..................as principal and..................as sureties, are held and firmly bound unto the State of Iowa in the penal sum of one thousand dollars, for the payment of which we bind ourselves, our heirs, executors and administrators.

The condition of this obligation is such that, whereas, the above bound .... was on the ......day of ....189.., by the District (or Superior) Court of............county (or city), State of Iowa, granted a permit to buy, keep and sell intoxicating liquors for lawful purposes at (*particularly describe the place*)......................... Now, if the said .... shall well and truly observe and obey the laws of Iowa, now or hereafter in force in relation to the sale of intoxicating liquors, and pay all fines, penalties, damages, and costs that may be assessed or recovered against him for the violation of such laws during the time of the continuance of said permit, then this bond to be void, otherwise to be and remain in full force and effect.

Signed this.........day of................, A. D. 189..

..................................., *Applicant.*

....

....

STATE OF IOWA, }
..............COUNTY, } SS.

I, ... , do solemnly swear (or affirm) that I will well and truly perform all and singular the conditions of the within bond, and keep and perform the trust confided in me to purchase, keep and sell intoxicating liquors. I will not sell, give or furnish to any person any intoxicating liquors otherwise than as provided by law, and especially, I will not sell or furnish any intoxicating liquors to any person who is not known to me personally, or duly identified; nor to any minor, intoxicated person, or persons who are in the habit of becoming intoxicated; and I will make true, full and accurate returns of all certificates or requests made to or received by me as required by law; and said returns shall show every sale and delivery of such liquors made by or for me during the months embraced therein, and the true signature to every request received and granted; and such returns shall show all the intoxicating liquors sold or delivered to any and every person as returned.

Subscribed in my presence and sworn to before me by the said .... on this ...... day of ...., A. D. 189..

....

Clerk of the Court.

(To go on back of bond.)

QUALIFICATIONS OF SURETIES.

STATE OF IOWA, }
............COUNTY, } SS.

We, the undersigned, first being duly sworn, depose and say, and each for himself deposes and says that he is one of the sureties whose name is subscribed to the within and foregoing bond; that he is a resident of the

State of Iowa; that he is worth double the sum secured by said bond beyond the amount of his debts and liabilities, to-wit: the sum of.................... dollars; and that he has property liable to execution in said State equal to the sum secured in said bond, to-wit: the sum of................dollars.

....
....
....

Subscribed in my presence and sworn to before me by................ this ...... day of ...., A. D. 189..

....
Clerk of the Court.

[OFFICIAL FORM D.]

PERMIT.

Whereas, ..., a registered pharmacist, of the State of Iowa, Certificate No. ...., (of the firm of)...................... did on the........day of........................., A. D. 189.., publish his notice and file in the office of the clerk of the district (or superior) court in and for....................county (or city), Iowa, his petition and bond, as provided by chapter 6, Code of 1897, for a permit to buy, keep and sell intoxicating liquors for pharmaceutical and medicinal purposes, alcohol for specified chemical mechanical purposes, and wine for sacramental purposes, but for no other purpose whatever, in the (township, town or ward) of.........................(*describe street, block and number*)**, in the county of........................., State of Iowa.**

And it appearing that the said Registered Pharmacist's Certificate of Registration, No. ...., is in full force and effect for the town of ...., above mentioned, and in accordance with the pharmacy law of the State of Iowa, and the court being duly satisfied that the requirements of the law have in all respects been fully complied with, and that said applicant is entitled to a permit as provided by chapter 6, Code of 1897, it is ordered that he be and is hereby authorized, from and after the ....day of................., 189.., to buy, keep and sell intoxicating liquors for pharmaceutical and medicinal purposes, and alcohol for specified mechanical purposes, and wine for sacramental purposes, but for no other purpose whatever, at the place aforesaid, so long as his Certificate of Registration is in full force and effect, or until this permit is otherwise revoked according to law.

..
Clerk of District (or Superior) Court,
..................County (or City) Iowa.

[OFFICIAL FORM E.—SERIES A.]

REQUEST OF PURCHASERS.

..............................., Iowa, ...189....

To.................. ....*Reg Phar. No*.............

I hereby make request for the purchase of the following liquors:

AMOUNT.	KIND.
....	....
....	....

My true name is......................., I am not a minor, and I reside in............township (or town) of.........., at No. ...., in the county of....... ...., State of .... The actual purpose for which this request is made is to obtain the said liquor for..
(If for applicant, say myself; if for another give name, age and residence.)

and the same is desired for..use, and neither myself nor the said ....habitually uses intoxicating liquors as a beverage.

(Signature of purchaser)......................................

Attested by..

Reg. Phar. No...........

[OFFICIAL FORM E.—SERIES B.]

CERTIFIED REQUEST OF PURCHASERS.

.... *Iowa*, ... *189*..

To.. *Reg. Phar. No*.........

I hereby make request for the purchase of the following intoxicating liquors:

AMOUNT.	KIND.
....	....
....	....

My true name is.................., I am not a minor, and I reside in..............township (or town) of............ at No....., in the county of.................., State of.................. The actual purpose for which this request is made is to obtain the said liquor for..
(If for applicant, say myself; if for another, give name, age and residence.)

and the same is desired for...............use, and neither myself nor the said.. habitually uses intoxicating liquors as a beverage.

(Signature of purchaser)..

I,.........................., hereby certify that I am acquainted with.........................., the applicant for the purchase of the foregoing described liquors, and that said..........................is not a minor and is not in the habit of using intoxicating liquors as a beverage and is worthy of credit as to the truthfulness of the statements in the foregoing request, and my residence is .... , No......., Street..................

(Signature of certifier)..

Attested by..

Reg. Phar. No...........

[OFFICIAL FORM F.]

PERMIT-HOLDER'S RECORD OF PURCHASES AND USES OF INTOXICATING LIQUOR.

For the months of................and................, 189..

OF WHOM PUR-CHASED.	DATE OF RECEIPT	AMOUNT PUR-CHASED.			KIND.	AM'T ON HAND AT COMMENC'T OF THE MONTH OF...........			TOTAL ON HAND AND RECEIVED.			AMOUNT SOLD.			AMOUNT USED.			AM'T ON HAND AT THE END OF THE MONTH OF..............		
		Gals.	Qts.	Pts.		Gals.	Qts.	Pts.	Gals.	Qts.	Pts.	Gals.	Qts.	Pts.	Gals.	Qts.	Pts.	Gals.	Qts.	Pts.
....	....	.....	.....	.....	Alcohol	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	....	.....	.....	.....	Whisky	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	....	.....	.....	.....	Brandy	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	....	.....	.....	.....	Gin	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	....	.....	.....	.....	Wine ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

[OFFICIAL FORM 6.]

PERMIT HOLDER'S BI-MONTHLY STATEMENT TO COUNTY AUDITOR, OF PURCHASES, SALES AND USE OF INTOXICATING LIQUORS.

For the month of .... *and* ...., *189*..

OF WHOM PUR-CHASED.	DATE OF RECEIPT	AMOUNT PUR-CHASED.			KIND.	AMT. ON HAND AT COMMENC'T OF THE MONTH OF			TOTAL ON HAND AND RECEIVED			AMOUNT SOLD.			AMOUNT USED.			AMT. ON HAND AT THE END OF THE MONTH OF		
		Gals.	Qts.	Pts.		Gals.	Qts.	Pts.	Gals.	Qts.	Pts.	Gals.	Qts.	Pts.	Gals	Qts.	Pts.	Gals.	Qts.	Pts.
					Alcohol															
					Whisky															
					Brandy															
					Gin															
					Wine															

STATE OF IOWA, }
.... COUNTY. } ss.

I, ..., Reg. Phar. No. .... of .... town, ... county, State of Iowa, being duly sworn, on oath depose and say that the above and foregoing statement of purchases, aggregate sales and uses of intoxicating liquors, under my permit for the months of .... and ...., 189.., is a true and correct statement as I verily believe,

....

Subscribed in my presence and sworn to before me by .... on this .... day of ...., A. D. 189..

....
County Auditor or Notary Public.

[OFFICIAL FORM H.]

PERMIT-HOLDER'S BI-MONTHLY REPORT OF REQUESTS AND AFFIDAVIT.

STATE OF IOWA, } ss.
...............COUNTY, }

I, ..., Reg. Phar. No........, being duly sworn on oath state that the requests for liquors herewith returned are all that were received and filled at my pharmacy (or place of business) under my permit during the months of............and............., 189.., that I have carefully preserved the same and that they were filled up, signed and attested at the date shown thereon as provided by law, that said requests were filled by delivering the quantity and kind of liquors required and that no liquors have been sold or dispensed under color of my permit during said months except as shown by the requests herewith returned, and that I have faithfully observed and complied with the conditions of my bond and oath taken by me thereon endorsed, and with all the laws relating to my duties in the premises.

....

STATE OF IOWA, } ss.
...............COUNTY, }

I, ..., Reg. Phar. No ...., first being duly sworn, depose and say that I am clerk for......................, and that no liquors have been sold, dispensed or disposed of by me, in any manner, during the months of..................and..................., except as shown by the requests attested by me, filed herewith and included in the report of the said............................

....

STATE OF IOWA, } ss.
...............COUNTY, }

I, ..., Reg. Phar. No............, first being duly sworn, depose and say that I am clerk for......................, and that no liquors have been sold, dispensed or disposed of by me, in any manner, during the months of....................and................except as shown by the requests attested by me, filed herewith and included in the report of the said.......................

....

The foregoing statement (was or were) subscribed to in my presence, as indicated therein, and sworn to before me by the said.................... and said.... ....and said..............................on this.........day of......................, A. D. 189..

....

County Auditor or Notary Public.

A GENERAL REPLY.

To the numerous inquiries, as to the proper fulfillment of a Registered Pharmacist's duties in regard to the sale of POISONS, we direct your attention to chapter 18, laws of 1897, as now amended:

Notice first, that *all Poisons* must be distinctly labeled, as follows: (See section 2593.)

Before selling or delivering any poisons, the box, vessel, or paper in which the poison is contained, and also the outside wrapper or cover, must be labeled with the name of the article, and the word "POISON," and the name and place of business of the person or firm selling it

Second, that the sale of poisons is delegated solely to Registered Pharmacists (See section 2588.)

No one except a Registered Pharmacist can lawfully sell poisons of ANY KIND, the only exception being Concentrated Lye and Potash, which can be sold by any person, when it is properly labeled, as above stated. (See section 2588.)

Third, the sale of all poisons enumerated in Schedule "A," and all others not enumerated in Schedule "B," must be registered in the "POISON REGISTER." The poisons enumerated in Schedule "B" need not be registered when sold

Fourth, the purchaser's signature is not required by law on the "POISON REGISTER," only his name; but the dispenser (the one selling) may require it, before selling or delivering, if he thinks it advisable.

We republish Official Form No. 6. Form for

POISON REGISTER.

Date.	Quantity.	Name of Poison.	PURCHASERS' REPRESENTATIONS.		PURCHASERS.		Name of Dispenser.	Remarks.
			For what purpose wanted.	For whom wanted.	Name or Signature.	Address.		

CERTIFICATE.

OFFICE OF THE COMMISSIONERS OF PHARMACY
FOR THE STATE OF IOWA.

I, Chas. W. Phillips, Secretary of the Commission of Pharmacy for the State of Iowa, having custody of the register and records of the Commission, hereby certify that the regulations, opinions, forms and notices herein contained are true and correct copies of the original official regulations, forms, notices, and opinions on file in this office.

In testimony whereof I have hereunto set my hand and affixed the seal of the Commission. Done at Des Moines, this 11th day of October, 1897.

[SEAL.]

CHAS. W. PHILLIPS,
Secretary of the Commission.

TENTH ANNUAL REPORT

OF THE

STATE DAIRY COMMISSIONER

TO THE

GOVERNOR OF THE STATE OF IOWA,

FOR THE YEAR 1896.

W. K. BOARDMAN,

State Dairy Commissioner.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

DES MOINES:
F. R. CONWAY, STATE PRINTER.
1897.

REPORT OF THE STATE DAIRY COMMISSIONER.

To His Excellency, Hon. Francis M. Drake, Governor of Iowa:

I have the honor to transmit to you herewith, my annual report for the year ending October 31, 1896, in accordance with law, the tenth annual report of the office of state dairy commissioner.

Respectfully,

W. K. BOARDMAN,
State Dairy Commissioner.

OLEOMARGARINE.

But one special internal revenue tax for the sale of oleomargarine was issued during the fiscal year ending June 30, 1896. This was issued September 11, 1895, and was referred to in my last report. No business in oleomargarine was carried on by the person having this special tax, during the balance of the year.

The records of the internal revenue department show that no special tax or license for the present fiscal year, beginning July 1, 1896, has been issued in Iowa. Nevertheless, we were able to detect and convict two violators of our state anti-color law.

The first case was *State of Iowa, Clinton County v. The Armour Packing Co., and J. G. Grove, Manager of Said Company.* The state milk inspector for the city of Clinton, Allen E. Rumble, on May 5, 1896, filed an information charging J. G. Grove, agent for the Armour Packing Co., with the offense of selling imitation butter. Warrant was issued, defendant arrested, and on the 6th day of May, 1896, he plead guilty to the charge, and was fined $100 and costs. I called the attention of the internal revenue officer, located at Clinton, to the case, which resulted in Mr. Grove's appearance before the United States commissioner at Dubuque, and he was bound over on the charge of violating the internal revenue law, to appear at the September term of the federal court at Cedar Rapids, at which time he was dismissed. I had a desire to be fully informed in regard to this case, as it was of much interest and importance to know whether this kind of guerrilla warfare could be practiced and agents be established in Iowa to supply dishonest hotel, restaurant and boarding house keepers with an unlawful product. I therefore concluded to investigate, and the following correspondence was the result:

DES MOINES, Iowa, October 22, 1896.

Hon. Cato Sells, United States District Attorney, Vinton, Iowa:

DEAR SIR—I have been officially informed that the case of James G. Grove, manager of the Clinton branch of the Armour Packing Co., which was to have been called in the September term of the federal court at Cedar Rapids, was dismissed at your recommendation. The facts pertaining to the case are as follows: P. T. Goulden, of Clinton, Iowa, on or about the 19th day of March, 1896, called at the office of the Armour Packing Co., and inquired for a tub of oleomargarine; the agent, Mr. Grove, stated that they had none on hand, but he could order a ten-pound tub for him from the Kansas City house; he further stated that it would be there in a few days and for him to call for it. On the 24th day of March, 1896, Mr. Goulden, accompanied by A. E. Rumble, called at the office of said company at Clinton, and the agent, J. G. Grove, stated that the tub of oleomargarine was there and proceeded at once to another part of the building and brought out a ten-pound tub. Before receiving the package, Mr. Goulden requested to see the goods and examine the same, and the package was then opened and the quality inspected by both Goulden and Rumble, whereupon Mr. Goulden paid him $1.60 for the package.

The Armour Packing Co. had paid no special tax for the manufacture or sale of oleomargarine in Iowa. The goods above referred to were delivered by and the money received by Mr. Grove, the authorized agent for the Armour Packing Co. I cannot conceive how such a transaction can be legally considered anything but a genuine purchase and sale in the state of Iowa. The internal revenue officer at Clinton, to whom I imparted the evidence, so considered it, and gave me to understand that it was a strong case. He saw the package of oleomargarine after it had been delivered to me. The commissioner at Dubuque considered the evidence sufficient to bind the party over to appear at the term of court previously referred to. I wish to know upon what grounds you recommended the dismissal of this case? I request this, because I wish to be informed so that in the future I may know in case similar transactions are brought to my attention, what action, if any, to take. I may state here, the state case against the Armour Packing Co. and Mr. Grove terminated by Mr. Grove pleading guilty to the violation of the state law. An early reply is requested. Very respectfully,

W. K. BOARDMAN,
State Dairy Commissioner.

Hon. Cato Sells replied, directing me to correspond with Hon. W. H. Stackhouse, collector of internal revenue, at Burlington, Iowa. I sent a copy of my letter to Mr. Sells to the revenue collector, and received the following reply:

BURLINGTON, Iowa, November 12, 1896.

Hon. W. K. Boardman, State Dairy Commissioner, Des Moines, Iowa:

DEAR SIR—Replying to your letter of the 22d ult. to U. S. Attorney Sells, enclosed in your favor of yesterday to this office, referring to the dismissal of the case in the federal court against J. G. Grove for alleged violation of the internal revenue law, I have to inform you that a thorough investigation of this case developed the fact that in this instance, as well as in all others where said J. G. Grove delivered packages of oleomargarine, he was in no wise a dealer in such article, but simply took orders for the Armour Packing Co., of Kansas City, Kan., manufacturers of oleomargarine; the manufacturers then filled the orders, marked the goods in the name of the purchaser—in this instance J. P. Goulden—and shipped the goods to their agent in Clinton, J. G. Grove, for delivery.

As Mr. Grove was simply in the employ of the Armour Packing Co. as their agent at Clinton, whose duty it was to solicit orders, deliver the goods he received from the said Armour Packing Co. marked to the purchaser, collect for the same and remit to said Armour Packing Co., he in no wise incurred liability as a dealer in oleomargarine under the internal revenue laws of the United States. Upon being informed of the facts in the case, the department immediately ordered the dismissal of the same. Yours truly,

(Signed) W. H. STACKHOUSE,
Collector.

I did not feel satisfied with this construction of the law and view of the case, and after consulting with able attorneys, I addressed the following letter to Hon. W. S. Forman, United States commissioner of internal revenue:

DES MOINES, Iowa, November 24, 1896.

Hon. W. S. Forman, Commissioner of Internal Revenue, Washington, D. C.:

DEAR SIR—Herewith find a correspondence with United States Attorney Cato Sells, of Vinton, Iowa, and W. H. Stackhouse, revenue collector, Burlington, Iowa, pertaining to the dismissal of a case in the federal court against one J. G. Grove. The facts in the case are presented in my letter above referred to, addressed to Hon. Cato Sells. These facts and the reason given by the collector do not appear to me to warrant the dismissal of the case. Mr. Goulden visited the office of the Armour Packing Co. at Clinton, Iowa, to purchase some butterine. Mr. Grove stated he did not have any, but would send to the Kansas City house, and get him a tub. When Mr. Goulden called again in a few days, the tub was produced, whereupon Mr. Goulden requested Mr. Grove to open it so that he might examine the goods. This was done, and as the color was satisfactory, the sale was completed at this time by Mr. Goulden receiving the tub and paying Mr. Grove $1.60 for the same. There is nothing to show that the tub was shipped from Kansas City in the name of Goulden, neither did Mr. Goulden pay any freight or receive a receipt for any freight paid. From first-class legal authorities of this state, I am informed that the transaction at Clinton constituted a genuine sale and purchase of goods. The grounds upon which this case was dismissed would permit any manufacturer of oleomargarine placing agents in any or all towns and cities of the United States, thereby doing away entirely with the necessity of the wholesale dealer's special tax, provided the manufacturer paid his special tax.

I do not contend that where an order is sent directly, or through the agent, to the manufacturer, and the goods are shipped directly to the purchaser, and the money or draft remitted direct to the manufacturer, that a violation of the revenue law would take place, but this is an entirely different case, and I deem it of so much importance that I feel called upon to bring the matter to your attention, so the entire subject may be reviewed, to the end that a ruling may be rendered. Trusting that this may meet with your prompt consideration I remain,

Yours respectfully,

W. K. BOARDMAN,
State Dairy Commissioner.

The following reply was received, accompanied by circular No. 339, pertaining to the subject:

TREASURY DEPARTMENT,
OFFICE OF COMMISSIONER OF INTERNAL REVENUE,
WASHINGTON, D. C.

Hon. W. K. Boardman, State Dairy Commissioner, Des Moines, Iowa:

SIR—I have received your letter of the 23d ult., enclosing copies of correspondence, which you have had with the collector of internal revenue, at Burlington, Iowa, and with the United States district attorney for the northern district of Iowa, relating to the dismissal, at the suggestion of this office, of the case of the *United States v. J. G. Grove*, wherein the defendant was charged with having carried on business as a wholesale dealer in oleomargarine, at Clinton, Iowa, without having paid special tax therefor, he having delivered an original stamped package of oleomargarine to P. T. Goulden, upon an order received by him from Mr. Goulden. You express the opinion that the dismissal of this case was not warranted by the facts, viz: "Mr. Goulden visited the office of the Armour Packing Co., at Clinton, Iowa, to purchase some butterine. Mr. Grove stated he did not have any, but would send to the Kansas City house and get him a tub. When Mr. Goulden called again in a few days, the tub was produced, whereupon Mr. Golden requested Mr. Grove to open it so that he might examine the goods. This was done, and as the color was satisfactory, the sale was completed at this time, by Mr. Goulden receiving the tub, and paying Mr. Grove $1.60 for the same. There is nothing to show that the tub was shipped from Kansas City in the name of Goulden. Neither did Mr. Goulden pay any freight, or receive a receipt for any freight paid."

From affidavits and statements filed in this office, by the Armour Packing Co., at Kansas City, it appears that the order given by Mr. Goulden to their agent, Mr. Grove, at Clinton, Iowa, for this oleomargarine, was sent by Mr. Grove to them, and that, upon their receipt of the order, a ten-pound package of oleomargarine was marked and set aside in their factory in Kansas City, as the property of Goulden, and was so charged and entered on their books, and sent out in their car, billed and invoiced for delivery to him; and that upon its arrival at Clinton, Iowa, the package was delivered to Mr. Goulden by Mr. Grove, their agent, who collected and remitted to them the amount of the bill therefor.

Upon this state of facts under the ruling of this office, neither the Armour Packing Co. nor Mr. Grove, their agent, could be lawfully held liable for special tax at Clinton, Iowa.

It is held that where an oleomargarine manufacturer's agent who keeps on hand no oleomargarine for sale, receives orders for oleomargarine, if all orders thus taken are sent to their factory and there filled, and the stamped packages of oleomargarine, are there set apart as the property of the person ordering, and billed to them, and these packages are sent out, each bearing a tag or label giving the name or address of the purchaser, upon their arrival at their destination the agent of the manufacturer may (whether he be paid a salary or commission) receive and deliver them, and collect and remit the money therefor, without involving either himself or his principal in special tax liability. Respectfully yours,

W. S. FORMAN,
Commissioner.

CIRCULAR NO. 339.

MODIFYING CIRCULAR NO. 285, CONCERNING SHIPMENTS OF SPIRITS, ETC., MARKED C. O. D.

TREASURY DEPARTMENT,
OFFICE OF INTERNAL REVENUE,
WASHINGTON, D. C., January 13, 1896.

To Collectors of Internal Revenue:

Circular No. 285, relating to shipments of distilled spirits to be paid for on delivery, issued by this office March 5, 1895, is hereby modified as follows:

When an offer is made *bona fide* by any person to purchase distilled spirits or any other goods for the sale of which special tax is required to be paid by the internal revenue laws, and an order therefor is given by him, with a request that the price be collected at the time and place of the delivery of the goods, and such order is accepted by the seller, and the goods are separated from the other goods of the seller, at his place of business authorized by the internal revenue laws of the United States, and are there set apart as the property of the person ordering, and so delivered to the carrier, with instructions to deliver them to the purchaser at the place named by him and to collect the purchase money at that place, it is held that the place of sale is the place where such order is received and the goods are set apart and delivered to the carrier, and that special tax is not required by these laws to be paid at the place where the delivery is made by the carrier, and the purchase money collected in accordance with the purchaser's request.

JOHN W. MASON,
Commissioner.

We were much disappointed with this ruling, but as it is of long standing, made in relation to the sale of spirituous liquors, we must conclude that it is in accordance with the best construction of law. Therefore the only remedy lies in increased vigilance on the part of state and other officials whose duty it is to enforce state laws governing and regulating the traffic.

The other violation was one of a different character. During September, of the present year, Frank M. Brown, state milk inspector, of Cedar Rapids, was in Oelwein, Iowa, on business, and while in the office of the United States Express Co., noticed several tubs of oleomargarine consigned to Wood Bros., contractors, who were doing extensive grading for the Chicago Great Western railway, at that place. Mr. Brown informed me regarding the discovery, and on September 29, I made a visit to Oelwein, and the Wood Bros. camp, where I found quite a large boarding establishment. I discovered empty oleomargarine tubs with government revenue stamps affixed thereon, and enough of the original contents remaining inside to show that it was of a yellow color. I swore out a search warrant and with the constable, made a search of the premises, securing the necessary sample. Mr. Frank Wood was present, and after I read the law to him, he stated that this was his first intimation that there was such a law, and that he had no intention of violating any state law, and was willing to settle the case without further costs. I immediately filed information in the justice court at Oelwein, and Wood Bros. plead guilty. The record is as follows:

In Justice Court, Oelwein Township, Fayette county. Before W. M. Irvine, Justice of the Peace.

THE STATE OF IOWA,
vs.
JOHN WOOD & BROS.

JOHN JAMISON,
Attorney for Plaintiff.

Be it remembered, that on this 30th day of September, 1896, came W. K. Boardman, state dairy commissioner, and filed as his cause of action, a complaint against the defendants, and accusing the defendants of using in their boarding house, oleomargarine, colored and being imitation of butter, and serving same to their employes. Said W. K. Boardman applied for a search warrant, which was issued by me, and put in the hands of G. R. Spensley, constable, who returned the same duly served with a portion of the substitute for butter in his possession, and delivered the same to me. An information was then filed by W. K. Boardman, and a warrant was issued for the arrest of said Wood Bros. and put in the hands of G. R. Spensley, constable, for service, who arrested John Wood, who appeared for Wood Bros. The information was read to him, and he plead guilty to the charge set forth in the information. And now, after hearing the evidence in the case, the court has adjudged that the defendants be fined in the sum of $25, and costs of the prosecution, taxed by me at $5.70, which fine and costs were paid by defendants and said defendant discharged by the court. Given under my hand this 30th day of September, 1896.

W. M. IRVINE,
Justice of the Peace.

PROTECTIVE LAWS.

The progress of the dairy interests in securing both state and national legislation to protect itself against the oleomargarine fraud has been reasonably successful. It has so far met with but two failures of any great importance since the fight began in earnest. I refer to its absolute defeat in Illinois, and its partial success in Michigan. In the states of Delaware, Pennsylvania and Virginia, the sale and manufacture of imitation butter and cheese are absolutely prohibited. In Montana, a license tax of 10 cents per pound is required, which is practically prohibition. The states of Vermont, Minnesota and West Virginia have the pink color law, and the anti-color law is in force in the states of California, Connecticut, Iowa, New Hampshire, New Jersey, New York, Ohio, Oregon, Maine, Massachusetts, Missouri, Nebraska and Wisconsin. There is no law upon the subject in Georgia, Kansas, Nevada, South Carolina, South Dakota, Texas and Wyoming. Most of the states not mentioned above have some laws upon the subject. They permit the sale of oleomargarine, but attempt to regulate it so as to prevent deception in its sale and use. Our experience in Iowa under such laws justifies us in stating that they are of no value whatsoever, and are not worth, to the interests which they are intended to protect, the paper upon which they are printed, but are simply made to be violated, and no state, for any length of time, will furnish the means and officials necessary to undertake to enforce them. Most of these laws require the branding and marking of the article offered for sale. In some cases the consumer must be notified; in others signs must be placed in the room where the article is sold or consumed. The following are states not enumerated and a digest of their laws:

Alabama—Manufacture and sale as genuine butter prohibited.

Arkansas—Sale allowed if branded.

Colorado—License law. Manufacturers must pay $250; wholesale dealers, $125; retail dealers, $25. Consumer must be notified.

District of Columbia—Manufacture and sale allowed if branded and marked.

Florida—Penalty for *knowingly* selling or serving as butter.

Idaho—Misdemeanor to manufacture without branding, or to sell as butter.

Illinois—*Knowingly* manufacture or sell as butter or cheese, without stamping name. Must notify consumer.

Indiana—Can sell if labeled with appropriate name.

Kentucky—Can sell if package is marked.

Louisiana—Can sell if package is marked.

Maryland—Can manufacture and sell if package is marked and consumer notified.

Michigan—Prohibits manufacture and sale as butter; can manufacture and sell as oleomargarine, with signs.

Mississippi—Can manufacture and sell if package is marked and a tax of $50 is paid.

North Carolina—Can sell if labeled.

North Dakota—Can sell if sold for what it is.

Rhode Island—Can sell if branded.

Tennessee—Can manufacture and sell under true name if marked.

Utah—Cannot manufacture yellow colored oleomargarine, but can sell that imported if marked.

Washington—Can manufacture and sell if sold for what it is.

This completes the list of states and gives a general idea of the kind of protection the dairy interests of the country and the consumer enjoy.

MEANS OF ENFORCEMENT.

Several of the states are without dairy or food commissioners, or other state officers whose special duty it is to enforce the laws for the protection of the dairy interests and the people against fraud and deception, in the sale of imitation butter and cheese. The states having such officials are California, Colorado, Connecticut, Iowa, Maine, Massachusetts, Michigan, Minnesota, New Jersey, New York, North Dakota, Ohio, Oregon, Pennsylvania, Washington and Wisconsin. There is another group of states in which the dairy interest is obliged to depend upon dairy associations to enforce the laws made for its protection. In some cases these associations have done good work. The states without a dairy commissioner, but having a dairy association, are: Alabama, Georgia, Illinois, Indiana, Kansas, Missouri, Nebraska, New Hampshire, North Carolina, South Dakota, Utah and Vermont. The states having neither commissioner nor dairy association are: Arkansas, Delaware, Florida, Idaho, Kentucky, Louisiana, Maryland, Mississippi, Montana, Nevada, Rhode Island, South Carolina, Tennessee, Texas, Virginia, West Virginia, Wyoming and District of Columbia.

EFFECT OF LEGISLATION.

Having now reviewed the laws, and the machinery for their enforcement, it will be of interest, and I trust of some profit, to notice the effect legislation has had in lessening the manufacture and sale of imitation and fraudulent substitutes for butter. It was not until the latter part of 1886 that there was any reliable means of knowing the amount of the output of oleomargarine, butterine, and other products of the same nature.

The law requiring the payment of a special tax, for manufacturing and selling the product itself, was passed August 2, 1886, and became effective November 1, of the same year. Since that time the internal revenue department at Washington has had a complete record of the manufacture and sale of all these compounds which, in the national law, are grouped together under the name of oleomargarine. From this source I obtain most of the figures that are used in this article.

The following table of production of oleomargarine for each fiscal year since November 1, 1886, the date the law took effect, is interesting as showing the extent of its operation in the country, the fiscal year ending June 30:

TABLE No. I.

	POUNDS.
On hand November 1, 1886	181,090
1887	21,513,537
1888	34,325,527
1889	35,664,026
1890	32,324,032
1891	44,392,409
1892	48,364,155
1893	67,224,298
1894	69,622,246
1895	56,958,105
1896	50,853,234
Total	461,422,659

There was a gradual increase in the production of oleomargarine up to and including 1894, when the amount produced for that year was nearly 70,000,000 pounds. During the past two years there has been a marked decrease, amounting to about 13,000,000 pounds for 1895, and 6,000,000 for 1896. The decrease during the fiscal year 1895 was all that could be expected under the circumstances, for but few of the states which had passed the prohibitory or restrictive laws were able to enforce them prior to the decision of the supreme court of the United States in the *Benjamin A. Plumley v. The Commonwealth of Massachusetts* case, rendered by Justice Harlan December 10, 1894. This important decision was promulgated about the middle of the fiscal year ending June 30, 1895, and its full meaning was not felt and fully understood by many retail dealers until months afterwards, hence a decrease of 13,000,000 pounds during that fiscal year should be considered very satisfactory, but a decrease of only 6,000,000 pounds during the fiscal year ending June 30, 1896, must be considered a great disappointment, and it is this fact that led me to make investigation and look up the facts and figures upon this very important subject. Another table of much interest is the following:

TABLE No. II.

Statement showing the quantity of oleomargarine produced, withdrawn tax-paid, for export, for exposition purposes, and lost or destroyed in manufactories monthly, from November 1, 1886, to June 30, 1896:

MONTHS.	Quantity returned to factories—lbs.	Quantity produced—lbs.	Withdrawn tax-paid—lbs.	Withdrawn for export—lbs.	Lost or destroyed—lbs.	Withdrawn for exposition purposes—lbs.
On hand Nov. 1, 1886	....	181,090	....	....	....	....
November	....	3,188,261	2,986,241	6,747	10,878	....
December	....	3,073,263	2,956,827	67,189	296	....
1887.						
January	....	2,804,096	2,720,235	144,585	3,054	....
February	....	2,779,855	2,716,759	60,500	9,182	....
March	....	3,568,254	3,512,183	96,499	12,472	....
April	....	2,839,858	2,780,307	149,818	6,866	....
May	....	1,885,027	1,769,954	136,523	2,210	....
June	....	1,875,423	1,801,108	62,701	6,267	....
July	....	1,208,638	1,170,136	33,210	1,191	....
August	....	2,425,226	2,396,238	110,990	601	....
September	....	2,703,256	2,568,007	68,917	262	....
October	....	3,082,985	2,915,016	92,201	1,979	....
November	....	3,008,715	2,862,321	148,899	....	....
December	....	3,256,028	3,120,343	78,500	....	....
1888.						
January	....	3,058,955	2,918,868	117,781	....	....
February	....	3,057,149	3,008,515	126,168	....	....
March	....	3,940,727	3,824,672	155,761	2,998	....
April	....	3,273,458	3,062,896	251,994	1,537	....
May	....	3,185,127	2,817,292	327,726	....	....
June	....	2,130,318	1,930,311	174,011	995	....
July	....	2,084,317	1,925,762	155,200	185	....
August	....	2,301,769	2,209,782	158,285	727	....
September	....	2,776,465	2,611,693	167,787	....	....
October	....	3,462,123	3,368,418	80,785	....	....
November	....	3,734,878	3,509,408	175,965	....	....
December	....	4,181,317	4,025,886	109,385	10	....
1889.						
January	....	3,607,753	3,853,350	137,123	....	....
February	....	3,523,381	3,266,245	228,191	1,000	....
March	....	3,047,875	3,077,831	70,424	....	....
April	....	3,057,841	2,886,481	285,948	....	....
May	....	2,310,943	2,114,678	126,223	70	....
June	....	1,575,362	1,514,658	68,579	....	....
July	....	1,404,749	1,442,094	95,580	....	....
August	....	1,975,773	1,914,016	49,222	4,973	....
September	....	2,274,456	2,130,648	167,826	....	....
October	....	4,072,333	3,668,057	190,385	688	....
November	....	3,188,757	3,174,648	121,630	....	....
December	....	3,072,028	3,010,319	93,770	....	....
1890.						
January	....	3,338,340	3,053,375	117,900	3,692	....
February	....	3,011,670	3,042,319	104,018	256	....
March	....	3,885,080	3,657,614	213,680	....	....
April	....	2,871,374	2,719,725	159,119	....	....
May	....	1,864,746	1,795,963	219,052	....	....
June	....	1,364,826	1,189,257	86,215	90	....
July	....	1,723,966	1,573,786	157,808	....	....
August	....	2,320,548	2,135,414	192,175	56	....
September	....	3,391,817	3,139,816	146,920	....	....
October	....	3,626,065	3,482,124	95,660	3,356	....
November	....	3,615,704	3,615,132	71,400	....	....
December	....	4,373,447	4,238,578	21,090	....	....

TABLE No. II—Continued.

MONTHS.	Quantity returned to factory—lbs.	Quantity produced—lbs.	Withdrawn tax-paid—lbs.	Withdrawn for export—lbs.	Lost or destroyed—lbs.	Withdrawn for exposition purposes—lbs.
1891.						
January	....	3,664,473	3,707,844	36,158	....	....
February	....	4,386,152	4,349,304	46,380	....	....
March	....	6,723,224	6,577,926	62,170	....	....
April	....	4,573,178	4,443,605	288,966	1,069	....
May	....	4,005,212	3,907,827	39,994	....	....
June	....	1,988,633	2,049,156	70,445	....	....
July	....	2,524,287	2,428,144	38,970	....	....
August	....	2,376,023	2,276,339	104,008	....	....
September	....	3,560,418	3,435,513	45,050	....	....
October	....	4,941,276	4,825,731	71,998	112	....
November	....	4,975,162	4,813,457	91,860	....	....
December	....	4,593,610	4,570,557	68,775	....	....
1892.						
January	....	4,777,319	4,563,758	83,306	....	....
February	....	4,864,932	4,407,287	218,570	....	....
March	....	5,916,871	5,711,766	189,090	....	....
April	....	4,606,392	4,711,950	122,598	....	....
May	....	3,160,611	2,935,407	134,198	....	....
June	....	2,067,255	2,035,592	127,354	....	....
July	....	2,653,622	2,398,926	284,558	....	....
August	....	3,745,521	3,571,333	141,870	....	....
September	....	5,116,208	4,698,580	145,853	....	....
October	....	5,195,351	5,239,316	219,263	....	....
November	....	7,311,563	6,707,850	229,732	....	....
December	....	6,541,521	6,202,957	283,058	....	....
1893.						
January	....	7,824,657	7,686,836	238,053	....	....
February	....	6,383,115	6,068,662	233,048	4,525	....
March	....	6,358,576	6,249,313	239,106	3,828	....
April	....	6,378,648	6,253,313	305,957	1,939	....
May	....	6,242,756	5,860,198	264,392	....	1,214
June	....	3,472,760	3,536,591	212,604	....	....
July	....	3,653,387	3,350,268	283,894	1,506	....
August	....	5,014,242	4,716,712	222,354	....	....
September	....	7,126,593	6,739,234	320,283	....	228
October	228	9,318,006	8,731,547	265,147	228	....
November	450	7,401,265	7,280,926	302,468	450	....
December	....	6,809,238	6,577,978	177,320	....	....
1894.						
January	....	6,566,191	6,215,278	255,889	....	....
February	....	6,243,843	6,127,589	287,461	643	....
March	....	5,889,497	5,639,414	415,549	61	....
April	....	5,418,302	4,956,192	358,951	....	....
May	....	3,631,891	3,443,917	328,171	2,691	....
June	....	2,552,791	2,317,008	339,196	....	....
July	....	3,028,980	2,695,799	257,784	....	....
August	....	5,429,045	4,756,718	262,076	....	....
September	....	5,928,516	5,862,883	317,141	....	100
October	100	7,046,429	6,616,097	338,673	100	....
November	....	6,638,846	6,297,673	290,424	....	....
December	....	5,075,604	4,834,587	242,503	....	....
1895.						
January	....	5,080,835	4,900,591	244,102	4,029	....
February	....	4,803,201	4,625,339	211,471	....	....
March	....	4,318,972	4,021,562	359,255	19,458	....
April	....	3,967,691	3,820,075	255,985	....	....
May	....	3,295,660	3,012,370	267,166	....	....
June	....	2,399,826	2,192,558	290,606	4,480	....
July	....	3,003,918	2,669,369	301,683	....	....
August	....	3,547,363	3,240,923	275,950	....	....
September	....	3,887,134	3,820,689	155,598	300	....
October	....	5,922,649	5,357,691	330,129	....	....
November	....	5,266,905	4,995,014	318,798	....	....
December	....	5,486,286	5,033,087	305,319	1,760	....

TABLE No. II—CONTINUED.

MONTHS.	Quantity returned to factories—lbs.	Quantity produced—lbs.	Withdrawn tax-paid—lbs.	Withdrawn for export—lbs.	Lost or destroyed—lbs.	Withdrawn for exposition purposes—lbs.
1896.						
January	....	4,830,851	4,735,497	228,860	40	....
February	....	4,501,881	4,335,331	204,327	....	....
March	....	4,962,718	4,642,891	293,626	....	....
April	....	3,741.993	3,630,624	247,033	....	....
May	....	2,929.162	2,697,332	241,231	....	....
June	....	2,822,879	2,563,845	303,705	330	....
Total	778	461,422,659	439,963.232	20,938,787	123,412	1,542
On hand June 30, 1896	....	....	....	....	....	396,404

From this table the average monthly exportation is compiled:

	POUNDS.
During the eight months ending June 30, 1887	90,566
DURING THE FISCAL YEAR ENDING JUNE 30TH—	
1888	140,516
1889	145,746
1890	134,866
1891	102,426
1892	107,981
1893	232,124
1894	283,890
1895	278,123
1896	258,850

The exportation for the last four years has been very uniform, and amounted to between 3,000,000 and 3,500,000 pounds per year. This is far less than has been generally supposed by those interested along dairy lines. It has also been thought that the production and consumption of oleomargarine was confined mostly to winter months. This also is a great mistake, for while the largest monthly production is in the fall and winter months, the amount produced in the spring and summer is not far behind. Since 1891 the production of no single month has fallen below 2,000,000 pounds. During the last four years the various months have averaged about as follows:

	POUNDS.
June and July	3,000,000
May	4,000,000
August	4,500,000
March and April	5,000,000
September and February	5,500,000
January and December	6,000,000
November	6,500,000
October	7,000,000

Oleomargarine has been manufactured by regular established factories during some portion of the time since 1886 in the following fifteen states:

California: 1893, 1 factory; 1894, 2 factories.

Connecticut: 1887, 1 factory; 1888, 7 factories; 1889, 7 factories; 1890 and 1891 4 factories.

Illinois: 1886, 11 factories, and each year since 6, 7 or 8.

Colorado: 1886, 2 factories, and 1 each year up to and including 1893.

Indiana: 1886, 1 factory, and 1 each year since with the exception of 1891

Iowa: 1891, 1 factory; 1893, 1 factory.

Kansas: 1886, 2 factories; 1887–1892, inclusive, 2 factories each year; 1893 and 1894, 3 factories; 1896, 2 factories.

Massachusetts: 1886-1891, inclusive, 1 factory each year.

Missouri: 1890, 2 factories; 1891–1896, inclusive, 1 each year.

Nebraska: 1891, 1 factory; 1892, 2 factories; 1893–1896, inclusive, 1 each year.

New Jersey: 1896, 1 factory.

New York: 1886, 6 factories; 1887, 1 factory; 1888, 1 factory.

Ohio: 1886, 4 factories; 1887, 1 factory; 1888, 4 factories; 1889–1896, inclusive, 2 each year.

Pennsylvania: 1886, 5 factories; 1887–1890, inclusive, 3 each year; 1891–1895, inclusive, 1 each year; 1896, 2 factories.

Rhode Island: 1886, 5 factories; 1887, 4 factories; 1892 and 1893, 3 each year; 1894, 1895 and 1896, 4 each year.

There are but four states that have been producers of oleomargarine continually each year since 1886. They are Illinois, Kansas. Ohio and Pennsylvania. The following states have dropped out of the list and are non-producers: California, Connecticut, Colorado, Iowa, Massachusetts, and New York. California ceased to manufacture at the end of the fiscal year 1894, Colorado 1893, Connecticut 1891, Iowa 1894, Massachusetts 1891, and New York in 1889. Missouri first manufactured in 1890, Nebraska in 1891, Rhode Island in 1886, but had no factories during 1888 to 1891 inclusive, but commenced operation again in 1892. New Jersey's first factory began operation during the year ending June 30, 1896. The number of manufacturers' special tax paid each year, have ranged from thirty-seven in 1886, to eighteen in 1892, the lowest number issued in any one year under the present law. The number issued during the last four years respectively, is twenty-two in 1893, twenty-three in 1894, twenty-one in 1895, and twenty-two in 1896.

The product of these manufactories has largely been consumed in this country, as less than 5 per cent has been exported.

TABLE No. III.

The following statement by districts shows the quantity, in pounds, of oleomargarine produced at manufactories, the quantity withdrawn therefrom tax-paid, for export and for exposition purposes, and the quantity lost or destroyed at manufactories during the two fiscal years ended June 30, 1895, and June 30, 1896, respectively; also the stock remaining on hand at the close of each year:

DISTRICT.	Returned to factory.	Produced.	Withdrawn tax-paid.	Withdrawn for export.	Lost or destroyed.	Withdrawn for expo'n purposes.	Remaining in factory June 30, 1895.
	FROM JULY 1, 1894, TO JUNE 30, 1895.						
First California	....	223,380	197,710	29,380	4,039	......	....
Connecticut *a*	....	9,029,269	6,403,535	2,641,407	....	..	17,565
First Illinois	100	31,903,871	31,554,541	356,871	4,580	100	244,744
Sixth Indiana	....	653,263	663,642	... .	....	......	3,237
Kansas *b*	....	7,189,335	7,110,806	73,990	19,448	......	60,065
Sixth Missouri	....	1,013,544	991,827	....	....	......	45,383
Nebraska *c*	...	3,009,880	3,004,230	5,600	....	......	....
Eleventh Ohio	....	1,552,292	1,549,010	....	....	......	8,868
Eighteenth Ohio	....	1,820,199	1,818,903	... .	... ...	......	5,495
First Pennsylvania	....	563,113	342,446	238,446	....	......	8,190
Total	100	56,958,105	53,636,242	3,337,486	28,067	100	393,597

DISTRICT.	Returned to factory.	Produced.	Withdrawn tax-paid.	Withdrawn for export.	Lost or destroyed.	Withdrawn for expo'n purposes.	Remaining in factory June 30, 1896.
	FROM JULY 1, 1895, TO JUNE 30, 1896.						
Connecticut *a*	...	8,644,860	6,396,020	2,236,585	....	......	29,840
First Illinois	....	29,172,122	28,591,110	584,876	2,090	......	238,790
Sixth Indiana	....	621,455	620,017	....	....	......	4,665
Kansas *b*	....	5,936,533	5,826,112	99,348	40	......	71,123
Sixth Missouri	....	688,487	700,963	....	....	......	32,907
Nebraska *c*	....	1,611,240	1,609,010	1,900	300	.....	....
Fifth New Jersey	....	67,234	62,014	2,850	. ...	.....	2,360
Eleventh Ohio	....	2,190,753	2,195,686	....	....	.....	3,955
Eighteenth Ohio	....	1,743,535	1,786,266	.. ..	....	.....	12,764
First Pennsylvania	....	177,025	4,565	180,650	....	......	....
Total	...	50,853,234	47,741,793	3,106,204	2,430	......	396,404

a Including the state of Rhode Island. No oleomargarine was manufactured in the state of Connecticut.

b Including the Indian Territory and Territory of Oklahoma; but no oleomargarine was manufactured in either of these territories.

c Including the states of North Dakota and South Dakota; but no oleomargarine was manufactured in either of these states.

As it is of much interest to the dairy people to know where the manufacturers of oleomargarine have found and are finding markets in this country for their compound, the following comprehensive table which gives this information is worthy of our careful study:

TABLE

Statement, by states and territories, showing the number of persons paying
31, 1886, to

STATES AND TERRITORIES.	OCTOBER 31, 1886, TO APRIL 30, 1887.			MAY 1, 1887, TO JUNE 30, 1887.			1888.			1889.			1890.		
	Manufacturers.	Wholesale	Retail.	Manufacturers.	Wholesale	Retail.	Manufacturers.	Wholesale	Retail.	Manufacturers	Wholesale	Retail.	Manufacturers.	Wholesale	Retail.
Alabama	....	2	11	....	1	3	....	1	9	....	2	30	....	2	68
Alaska	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Arizona	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Arkansas	....	6	67	....	2	20	....	3	21	....	5	25	....	5	22
California (*a*)	....	....	....	....	....	....	....	1	....	....	....	5	....	1	3
Colorado (*b*)	2	12	86	1	1	11	1	3	18	1	1	8	1	1	7
Connecticut (*c*)	...	6	151	1	2	66	7	12	286	7	14	413	4	10	416
Delaware	....	....	20	....	....	3	....	....	....	....	....	....	....	....	....
Dist. of C'lm'bia	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Florida	....	1	10	....	....	...	....	1	3	....	1	25	....	1	18
Georgia	....	1	12	....	....	4	....	1	8	....	....	7	....	....	2
Idaho	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Illinois	11	34	735	7	11	351	10	23	590	7	22	1,092	6	16	766
Indiana	1	1	46	1	....	10	1	5	82	1	4	85	1	4	40
Indian Territ'y	....	....	...	....	....	....	....	....	....	....	....	....	....	....	....
Iowa	....	1	1	....	....	..	....	1	1	....	....	8	....	....	4
Kansas	2	4	135	2	1	36	2	1	38	2	....	46	2	1	44
Kentucky	....	5	127	....	3	60	....	4	96	....	5	109	....	4	116
Louisiana (*d*)	....	5	19	....	1	1	....	3	11	....	3	53	....	4	58
Maine	....	1	9	....	....	5	....	....	....	....	....	....	....	....	....
Maryland (*e*)	....	2	29	....	....	12	...	2	15	....	...	16	....	1	13
Massachusetts	1	46	3,079	1	16	247	1	25	330	1	29	460	1	27	400
Michigan	....	21	334	....	7	128	....	23	204	....	29	309	...	25	308
Minnesota	....	8	4	....	....	....	....	....	....	....	....	....	....	....	....
Mississippi	....	....	5	....	....	....	....	....	....	....	....	....	....	....	....
Missouri	....	6	173	..	5	55	....	17	115	....	22	298	2	8	273
Montana (*f*)	....	10	34	....	3	9	....	4	14	....	6	15	....	7	14
Nebraska (*g*)	....	4	41	....	2	5	....	2	8	....	5	20	....	4	13
Nevada	....	2	....	....	1	....	....	....	....	....	....	....	....	....	....
N. Hampshire (*h*)	....	1	24	....	....	15	....	1	29	....	....	49	....	....	39
New Jersey	....	5	174	....	2	12	....	2	85	....	6	74	....	12	55
New Mexico (*i*)	....	5	33	...	1	15	...	3	18	....	1	10	....	....	....
New York	6	18	254	1	....	18	1	....	14	....	1	2	....	....	....
North Carolina	....	....	2	....	....	....	....	....	....	....	....	2	....	....	....
North Dakota	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Ohio	4	12	372	1	1	109	4	6	209	2	12	381	2	12	414
Oklahoma	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Oregon (*k*)	....	....	....	....	....	....	....	2	4	....	6	10	....	9	7
Pennsylvania	5	25	512	3	....	42	3	3	110	3	6	141	3	7	160
Rhode Island	5	18	404	4	6	208	....	....	....	....	....	....	....	....	....
South Carolina	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....
South Dakota	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Tennessee	..	10	56	....	2	16	....	2	32	....	..	21	....	3	53
Texas	....	9	32	....	3	6	....	5	13	....	9	66	....	5	49
Utah	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Vermont	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Virginia	....	1	19	....	....	2	....	....	5	....	2	7	....	....	4
Washington	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
West Virginia	....	....	7	....	....	4	....	....	5	....	....	9	..	2	46
Wisconsin	....	11	60	....	3	26	....	11	44	....	8	88	....	8	108
Wyoming	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Total	37	288	6,977	22	74	1,488	30	166	2,316	24	199	3.982	22	179	3,520

(*a*) Including the state of Nevada.
(*b*) Including the territory of Wyoming.
(*c*) Including the state of Rhode Island.
(*d*) Including the state of Mississippi.
(*e*) Including the state of Delaware, District of Columbia, and the counties of Accomack and Northampton, Virginia.
(*f*) Including the territories of Idaho and Utah.
(*g*) Including Dakota.
(*h*) Including the states of Maine and Vermont.
(*i*) Including the territory of Arizona.
(*k*) Including Alaska and Washington.

No. IV.

special taxes as manufacturers of and dealers in oleomargarine, from October
June 30, 1896.

1891.			1892.			1893.			1894.			1895.			1896.		
Manufacturers.	Wholesale	Retail.	Manufacturers.	Wholesale	Retail.	Manufacturers.	Wholesale	Retail.	Manufacturers.	Wholesale	Retail.	Manufacturers.	Wholesale	Retail.	Manufacturers.	Wholesale	Retail.
....	4	68	....	5	86	....	7	94	....	5	65	....	3	34	...	4	29
....	.....	......	....	.....	......	....	.....	0	...	.....	0	....	.....	......	....	.....	0
....	.....	......	....	2	7	...	1	10	....	.....	0	....	2	5	....	1	3
....	1	33	....	1	48	...	1	75	....	1	67	...	2	46	....	1	39
....	2	8	....	3	9	1	4	19	2	4	28	1	2	15	....	2	2
1	.....	10	1	3	15	1	7	83	....	7	93	....	8	80	....	4	63
4	9	437	....	8	91	....	8	95	....	1	9	....	3	12	....	.....	12
....	.....	......	....	.....	8	....	.....	31	....	1	49	....	.....	47	....	.....	6
....	.....	......	....	1	19	....	3	61	....	6	88	....	5	85	....	2	85
....	4	40	....	7	75	....	5	102	....	3	114	....	4	115	....	5	94
....	4	38	....	5	60	....	8	88	....	5	71	....	5	46	....	6	85
....	.....	......	....	2	27	....	.....	20	....	.....	......	..	.....	1	....	.....	0
6	14	962	6	15	1,140	7	19	1,446	7	23	2,078	7	15	1,605	8	15	1,827
....	5	113	1	2	138	1	5	253	1	6	308	1	2	157	1	4	139
....	.....	......	....	.....	83	....	.....	29	....	.....	41	....	1	28	....	.....	16
....	.....	11	....	1	40	1	5	136	1	7	125	....	1	81	....	.....	2
1	.....	194	2	1	1[illegible]7	3	1	228	3	.....	176	3	.....	101	2	1	72
....	5	206	....	7	141	....	4	151	....	5	168	....	4	125	....	4	150
....	3	53	....	5	54	....	7	57	....	4	65	....	4	67	....	7	88
....	.....	......	....	.....	20	....	2	25	....	3	50	....	3	18	....	1	6
....	1	45	....	1	11	....	2	20	....	4	27	....	2	25	....	3	28
1	34	451	....	16	269	....	28	192	....	28	256	....	29	197	....	2	40
....	16	380	....	18	368	....	20	355	....	22	531	....	15	438	....	14	360
....	1	......	....	5	15	....	10	42	....	8	35	...	10	28	....	2	7
....	.....	......	....	1	2	....	.....	5	....	.....	7	....	.....	4	....	.....	4
1	17	627	1	18	633	1	15	758	1	12	688	1	12	435	1	2	118
....	20	58	....	14	26	....	10	55	..	10	68	....	10	72	....	2	4
1	3	36	2	3	60	1	3	98	1	4	83	1	3	51	1	.....	23
....	.....	......	....	.....	2	....	.....	0	....	.....	0	....	.....	0	....	.....	0
....	.....	31	....	.....	6	....	3	9	....	2	10	....	1	6	....	.....	1
....	5	98	....	4	117	....	1	141	....	8	197	....	6	190	1	4	165
....	.....	4	....	.....	6	....	.....	8	....	1	19	....	.....	9	....	.....	5
....	1	4	....	4	19	....	3	9	....	11	68	....	9	69	....	4	46
....	.....	12	....	.....	29	....	1	26	....	.....	16	....	....	13	....	.....	8
....	.....	......	....	.....	4	....	.....	6	....	.....	2	....	.....	3	....	.....	4
2	10	485	2	13	478	2	9	309	2	10	559	2	10	447	2	10	379
....	.....	..	....	2	24	....	.....	5	....	.....	32	....	.....	17	....	.....	0
....	15	73	....	.....	1	....	2	0	....	.....	3	....	4	8	....	.....	0
2	59	1,100	1	27	625	1	20	196	1	20	388	1	21	505	2	15	361
....	.....	......	2	7	328	3	8	348	4	6	341	4	6	339	4	7	344
....	.....	......	....	3	26	....	2	47	....	2	49	....	3	24	....	2	14
....	.....	......	....	3	12	....	1	7	....	.....	8	...	.....	5	....	.....	0
....	7	127	....	6	82	....	18	118	....	6	72	...	4	49	....	2	33
....	7	49	....	13	108	....	16	106	...	17	103	....	13	88	....	15	56
....	.....	......	....	8	18	....	6	27	....	3	11	....	8	5	....	2	4
....	.....	......	....	.....	1	....	.....	0	....	.....	1	....	.....	0	...	.....	0
....	2	54	....	7	65	....	5	65	....	6	59	....	3	50	....	3	66
....	.....	......	....	17	121	...	16	91	....	12	68	....	2	45	....	.....	16
....	3	96	....	2	53	....	2	74	....	5	90	....	4	79	....	4	89
....	3	74	....	8	107	....	5	144	....	6	181	....	8	139	....	7	36
....	.....	......	....	4	17	....	.....	18	....	.....	15	....	.....	14	....	.....	6
19	255	5.914	18	257	5,760	22	283	6,369	23	279	7,554	21	243	5,972	22	157	4,380

This table shows a yearly increase (with one or two exceptions) in the number of wholesale and retail dealers from 1887 to the end of the fiscal year, June 30, 1894, at which time the number of retail special tax issued reached 7,554, the largest number issued in any one year. During the last two years there has been a decrease of 1,582 in 1895 over that of 1894, and 1,592 in 1896 over that of 1895, in the number of special tax issued. This decrease, though marked, is not as large as it should have been for the fiscal year of 1896. The United States supreme court declared the anti-color law constitutional in December, 1894, which gave state dairy commissioners, or other special state officials, several months before the beginning of the fiscal year 1896 in which to compel compliance with their prohibitory and restrictive laws. The officials in some of the states having anti-color and other effective laws, were very successful in their efforts, and these states show a large falling off in the number of dealers during the year 1896, while in others having equally as strong laws, the decrease in the number of special tax issued was small. In order to see more clearly the situation in this respect, I have prepared two tables; one composed of the states having anti-color or other effective laws, and the other of states having no laws, or such as are practically non-enforcible. In each of these tables the number of special tax issued in each state in the years 1894, 1895 and 1896, respectively, is given:

TABLE No. V.

Showing the states that have effective laws prohibiting the sale of yellow colored oleomargarine, and the number of retail licenses issued during the fiscal years of 1894, 1895 and 1896

STATES.	YEARS.		
	1894.	1895.	1896.
California	28	15	2
Connecticut	9	12	12
Delaware	49	47	6
Iowa	125	31	2
New Jersey	197	190	165
New York	68	69	46
Ohio	559	447	379
Oregon	3	8	....
Pennsylvania	383	506	361
Vermont	1	....	....
Virginia	59	60	66
Maine	50	18	6
Massachusetts	256	197	40
Minnesota	85	28	7
Missouri	688	435	113
Montana	68	72	4
Nebraska	83	51	28
New Hampshire	10	6	1
West Virginia	90	79	89
Wisconsin	181	139	36
Total	2,987	2,399	1,358

TABLE No. VI.

Showing the states without effective laws prohibiting the sale of yellow colored oleomargarine and the number of retail licenses issued during the fiscal years of 1894, 1895 and 1896.

STATES.	YEARS.		
	1894.	1895.	1896.
Alaska	....	....	....
Arkansas	67	46	39
Alabama	65	34	29
Arizona	....	5	3
Colorado	93	80	63
District of Columbia	88	85	85
Florida	144	115	94
Georgia	71	46	35
Idaho	....	1	....
Illinois	2,078	1,605	1,337
Indiana	303	157	189
Indian territory	41	28	16
Kansas	178	101	73
Kentucky	168	125	150
Louisiana	65	67	88
Maryland	27	25	28
Michigan	521	438	360
Mississippi	....	4	4
Nevada	....	....	....
North Carolina	16	13	8
New Mexico	19	9	5
North Dakota	2	3	4
Oklahoma	33	17	49
Rhode Island	341	339	34
South Carolina	49	24	14
South Dakota	3	5	....
Tennessee	73	49	38
Texas	103	88	56
Utah	11	5	4
Washington	68	45	16
Wyoming	15	14	6
Total	4,617	3,578	3,023

There are twenty states having effective laws; some have absolute prohibition, some the pink law, and others the anti-color law. Thirty states and territories have practically no laws upon the subject, that is, thirteen of these states have absolutely no laws and the other seventeen have laws permitting yellow colored oleomargarine to be sold if branded, marked, and customers in some cases notified of its true character. Such laws are of no practical value. Their enforcement is out of the question, and if not made to be violated, are, nevertheless, violated with impunity in all the states having them on their statute books. Every special tax issued to the retailer is evidence of this fact, for it has been absolutely demonstrated in Iowa that no retailer will pay the special tax if the opportunity for deception is removed by compelling oleomargarine of some other color than yellow to be his stock in trade. No friends of the dairy should ever again allow themselves to be deceived into thinking that they have accomplished anything for the industry by assisting to place any such law on the statute books of their state, for such laws are nothing but a delusion and a snare. Of the twenty states having effective laws, all but four have a state officer, or some association to enforce them; of the other thirty states and territories, twelve have officers and associations. As before stated, the largest number of retail special tax was issued in 1894, being 7,554. Of this number, 2,937 were issued in the twenty states having effective laws, and 4,617 in the thirty states and territories having defective laws. In the two following years, 1895 and 1896, the 2,937 special tax have decreased to 1,358, or 54 per cent, and the 4,617 have been reduced to 3,022, or 34 per cent. There can be no question but what the prohibitory and restrictive laws in these states have been a very strong factor in decreasing the number of special tax issued and the amount of oleomargarine sold and consumed, but there is another influence that must not be overlooked, and that is the low price butter has commanded during this period. This undoubtedly has had much to do in lessening the demand for the better grades of oleomargarine, but has not, we believe, affected the cheaper grades that are used by many chop houses, cheap restaurants and boarding houses. This is shown by the fact as pointed out before, of the large consumption during the summer months, when the price of choice creamery butter was within the reach of all. Another fact worthy of note, is that while the decrease in the number of retail dealers during 1895 was 1,582, and during 1896, 1,592, showing remarkable uniformity, the decrease of oleomargarine consumed was 12,459,816 pounds in 1895, and only 5,894,449 pounds in 1896. This is accounted for in the increase in the amount sold on the average by each retail dealer. In 1894 the average was 8,750 pounds; in 1895, 8,981 pounds; in 1896, 10,900 pounds, being an increase of 231 pounds per dealer in 1895 as compared with 1894, and 1,919 pounds per dealer in 1896 as compared with 1895.

Undoubtedly the profit from the sale of a pound of oleomargarine, to the retailer, is larger than can be realized on a pound of butter, and the manufacturer has made it an object for him to push the trade to the fullest extent possible.

By consulting table No. IV it will be seen that the states in the group having effective laws, where the largest number of special tax were issued during 1896, are Ohio, Pennsylvania, New Jersey and Missouri. A few special tax were issued in

Virginia and West Virginia; the first has prohibition and the other the pink law, but unfortunately neither has a state official whose special duty it is to look after dairy interests. If the laws in these states were honestly and vigorously enforced, it is not unreasonable to believe that 1,000 more special tax licenses would drop from the list, which would mean a decrease of about 11,000,000 pounds, and if in addition effective laws could be passed and enforced in Illinois, Michigan, Rhode Island, Kentucky, Indiana, Kansas and the District of Columbia, 2,000 more retail dealers would be dispensed with and there could be an additional decrease of fully 22,000,000 pounds in the consumption of oleomargarine.

This would practically remove from competition this dishonest and fraudulent compound, and furnish in these states a larger market, by 33,000,000 pounds, for honest butter. No state in the union is more interested in having this accomplished than Iowa. Our state holds first rank in the dairy industry of this country, and every factory and person financially interested should not hesitate to assist in any practical plan that will bring about this result. The National Dairy Union has met with great success, and, in fact, to a far greater extent than its most active members believed possible, in securing national attention and legislation, and it should be encouraged and assisted, as there is yet plenty of work to be done in this direction. The great western dairy territory including Iowa, Illinois, Wisconsin, Minnesota, Nebraska, Kansas and Missouri should unite for mutual protection, and render valuable aid to such states as are without effective laws in securing them, and giving assistance to all states that need help in vigorously enforcing such laws as they may have.

The development and rapid growth of the dairy industry in the great northwest makes it the imperative duty of this region to do everything possible, in a legitimate way, to regain that part of the markets of this country of which the oleomargarine traffic has robbed it, for 50,000,000 pounds of oleomargarine forced from the markets of this country would make room for at least a part of the rapidly growing increase of creamery butter, and be worth many millions of dollars to the farmers of this country during the years to come.

FILLED CHEESE.

In the last annual report of this department some twenty pages were devoted to the filled cheese question. The investigations made during the year 1895, and recorded therein, have attracted more or less attention, and have been of service in convincing our law-makers at Washington that the dairy interest needed their assistance in the enactment of a law upon this subject. The advance signatures of the last report upon the subject of filled cheese, were furnished to each member of the Iowa delegation in congress, and also sent to each member of the different committees that considered filled cheese legislation. To the credit of Iowa, all members of the Iowa delegation supported this movement, and each member informed this department that the information furnished demonstrated the importance of a national law taxing the manufactured product and licensing the manufacture and sale of filled cheese.

It is with much satisfaction that we are able to report that just such a law was enacted by congress, and became operative September 4, 1896.

The benefit of such a law was discussed at the annual meeting of the National Dairy Union, in January, 1895, and it assumed a definite shape at the last annual meeting at Chicago in January, 1896. This meeting was well attended and all the western dairy states were represented by able and earnest men.

The following resolutions were reported by the committee on legislation, and unanimously adopted:

> That it is hereby recommended that this Union shall present to the congress of the United States, a bill to limit the effect of the commerce clause of the constitution with respect to oleomargarine and filled cheese, being substantially the Hill-Apsley-Grout bill of the Fifty-third Congress.
>
> That it further recommends that the Union present a bill to congress to regulate the manufacture and the sale of filled cheese.
>
> It is further recommended that the Union present a bill to congress providing for the registering of state trade-marks.

President W. H. Hatch, of Missouri, James Hewes, of Maryland, and H. C. Adams, of Wisconsin, were appointed a committee to look after national legislation. Also a committee, with George W. Linn, of Chicago, as chairman, was appointed to promote dairy legislation in Illinois. Later, the New York Produce and Mercantile Exchange appointed a committee to assist in procuring national legislation. Thos. F. Shields, and W. B. Smith of New York City, were its active members, and are entitled to be remembered for the good work they have accomplished. Hon. W. H. Hatch, president of the National Dairy Union, gave much of his time to the cause, and Hon. H. C. Adams, and ex-Governor Hoard, of Wisconsin, visited Washington, and appeared before the ways and means committee of the senate, in the interest of filled cheese legislation. Bills upon this subject were introduced and referred to the committee on ways and means early in January, and passed through the usual course of postponements and delays.

The friends of the different bills were strong and earnest in advocating their favored measures, and the customary differences of opinion, jealousies and disagreement, were indulged in by congressional rivals and their respective supporters and the dairy press, but the earnestness of those directly interested was so strong that these differences were swept aside, and after a thorough investigation, the committee reported a substitute for all bills, which was passed without amendment by both the house and senate. The fight on this measure as is usually the case when the bill is a popular one, and the legislator desires to avoid making a damaging record, was made before the committees. The bill first passed the house, and on June 4th the senate gave it favorable consideration, and it was signed by President Cleveland on June 6th, becoming operative September 4, 1896. It passed the house by a vote of 140 to 58, and the senate by a vote of 37 to 13 against. The bill is as follows:

An Act defining cheese, and also imposing a tax upon and regulating the manufacture, sale, importation and exportation of "filled cheese."

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purposes of this act, the word "cheese" shall be understood to mean the food product known as cheese, and which is made from milk or cream and without the addition of butter, or any animal, vegetable, or other oils or fats foreign to such milk or cream, with or without additional coloring matter.

SEC. 2. That for the purposes of this act certain substances and compounds shall be known and designated as "filled cheese," namely: All substances made of milk or skimmed milk with the admixture of butter, animal oils or fats, vegetable or any other oils or compounds foreign to such milk, and made in imitation or semblance of cheese.

SEC. 3. That special taxes are imposed as follows:

Manufacturers of filled cheese shall pay $400 for each and every factory per annum. Every person, firm or corporation who manufactures filled cheese for sale shall be deemed a manufacturer of filled cheese. Wholesale dealers in filled cheese shall pay $250 per annum. Every person, firm or corporation who sells or offers for sale filled cheese in the original manufacturer's packages for resale, or to retail dealers as hereinafter defined, shall be deemed a wholesale dealer in filled cheese. But any manufacturer of filled cheese who has given the required bond and paid the required special tax, and who sells only filled cheese of his own production, at the place of manufacture, in the original packages, to which the tax-paid stamps are affixed, shall not be required to pay the special tax of a wholesale dealer in filled cheese on account of such sales.

Retail dealers in filled cheese shall pay $12 per annum. Every person who sells filled cheese at retail, not for resale, and for actual consumption, shall be regarded as a retail dealer in filled cheese, and sections 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3243 of the revised statutes of the United States are, so far as applicable, made to extend to and include and apply to the special taxes imposed by this section and to the persons, firms or corporations upon whom they are imposed: *Provided*, That all special taxes under this act shall become due on the 1st day of July in every year, or on commencing any manufacture, trade or business on which said tax is imposed. In the latter case the tax shall be reckoned proportionately from the first day of the month in which the liability to the special tax commences to the 1st day of July following.

SEC. 4. That every person, firm or corporation who carries on the business of a manufacturer of filled cheese without having paid the special tax therefor, as required by law, shall, besides being liable to the payment of the tax, be fined not less than $400 and not more than $3,000; and every person, firm or corporation who carries on the business of a wholesale dealer in filled cheese without having paid the special tax therefor, as required by law, shall, besides being liable to the payment of the tax, be fined not less than $250 nor more than $1,000; and every person, firm or corporation who carries on the business of a retail dealer in filled cheese without having paid the special tax therefor, as required by law, shall, besides being liable for the payment of the tax, be fined not less than $40 nor more than $500 for each and every offense.

SEC. 5. That every manufacturer of filled cheese shall file with the collector of internal revenue of the district in which his manufactory is located such notices, inventories and bonds, shall keep such books and render such returns of materials and products, shall put up such signs and affix such number to his factory, and conduct his business under such surveillance of officers and agents as the commissioner of internal revenue, with the approval of the secretary of the treasury, may by regulation require. But the bond required of such manufacturer shall be with sureties satisfactory to the collector of internal revenue, and in a penal sum of not less than $5,000; and the amount of said bond may be increased from time to time, and additional sureties required, at the discretion of the collector or under instructions of the commissioner of internal revenue. Any manufacturer of filled cheese who fails to comply with the provisions of this section or with the regulations herein authorized, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined not less than five hundred dollars nor more than one thousand dollars.

SEC. 6. That filled cheese shall be packed by the manufacturers in wooden packages only, not before used for that purpose, and marked, stamped and branded with the words "filled cheese" in black-faced letters not less than two inches in length, in a circle in the center of the top and bottom of the cheese; and in black-faced letters of not less than two inches in length in line from the top to the bottom of the cheese, on the side in four places equidistant from each other, and the package containing such cheese shall be marked in the same manner, and in the same number of places, and in the same discription of letters as above provided for the marking of the cheese; and all sales or consignments made by manufacturers of filled cheese to wholesale dealers in filled cheese or to exporters of filled cheese shall be in original stamped packages. Retail dealers in filled cheese shall sell only from original stamped packages, and shall pack the filled cheese when sold in suitable wooden or paper packages, which shall be marked and branded in accordance with rules and regulations to be prescribed by the commissioner of internal revenue with the approval of the secretary of the treasury. Every person who knowingly sells or offers to sell, or delivers or offers to deliver, filled cheese in any other form than in new wooden or paper packages, marked and branded as hereinbefore provided and as above described, or who packs in any package or packages filled cheese in any manner contrary to law, or who falsely brands any package or affixes a stamp on any package denoting a less amount of tax than that required by law, shall upon conviction thereof be fined for each and every offense not less than fifty dollars and not more than five hundred dollars or be imprisoned not less than thirty days nor more than one year.

SEC. 7. That all retail and wholesale dealers in filled cheese shall display in a conspicuous place in his or their salesroom a sign bearing the words "Filled cheese sold here" in black-faced letters not less than six inches in length, upon a white ground, with the name and number of the revenue district in which his or their business is conducted; and any wholesale or retail dealer in filled cheese who fails or neglects to comply with the provisions of this section shall be deemed guilty of a misdemeanor, and shall on conviction thereof be fined for each and every offense not less than fifty dollars and not more than two hundred dollars.

SEC. 8. That every manufacturer of filled cheese shall securely affix by pasting on each package containing filled cheese manufactured by him, a label on which shall be printed, besides the number of the manufactory and the district and state in which it is situated, these words: "Notice—The manufacturer of the filled cheese herein contained has complied with all the requirements of the law. Every person is cautioned not to use either this package again or the stamp thereon again, nor to remove the contents of this package without destroying said stamp, under the penalty provided by law in such cases." Every manufacturer of filled cheese who neglects to affix such label to any package containing filled cheese made by him or sold or offered for sale by or for him, and every person who removes any such label so affixed from any such package, shall be fined fifty dollars for each package in respect to which such offense is committed.

SEC. 9. That upon all filled cheese which shall be manufactured there shall be assessed and collected a tax of 1 cent per pound, to be paid by the manufacturer thereof; and any fractional part of a pound in a package shall be taxed as a pound. The tax levied by this section shall be represented by coupon stamps; and the provisions of existing laws governing the engraving, issue, sale, accountability, effacement and destruction of stamps relating to tobacco and snuff, as far as applicable, are hereby made to apply to stamps provided for by this section.

SEC. 10. That whenever any manufacturer of filled cheese sells or removes for sale or consumption any filled cheese upon which the tax is required to be paid by stamps, without paying such tax, it shall be the duty of the commissioner of internal revenue, within a period of not more than two years after such sale or removal, upon satisfactory proof, to estimate the amount of tax which has been omitted to be paid and to make an assessment therefor and certify the same to the collector. The tax so assessed shall be in addition to the penalties imposed by law for such sale or removal.

SEC. 11. That all filled cheese as herein defined imported from foreign countries shall, in addition to any import duty imposed on the same, pay an internal, revenue tax of 8 cents per pound, such tax to be represented by coupon stamps; and such imported filled cheese and the packages containing the same shall be stamped, marked, and branded, as in the case of filled cheese manufactured in the United States.

SEC. 12. That any person who knowingly purchases or receives for sale any filled cheese which has not been branded or stamped according to law, or which is contained in packages not branded or marked according to law, shall be liable to a penalty of fifty dollars for each such offense.

SEC. 13. That every person who knowingly purchases or receives for sale any filled cheese from any manufacturer or importer who has not paid the special tax herein provided for shall be liable, for each offense, to a penalty of one hundred dollars and to a forfeiture of all articles so purchased or received, or of the full value thereof.

SEC. 14. That whenever any stamped package containing filled cheese is emptied it shall be the duty of the person in whose hands the same is to destroy the stamps thereon; and any person who wilfully neglects or refuses so to do shall, for each such offense, be fined not exceeding fifty dollars or imprisoned not less than ten days nor more than six months.

SEC. 15. That the commissioner of internal revenue is authorized to have applied scientific tests, and to decide whether any substances used in the manufacture of filled cheese contain ingredients deleterious to health. But in case of doubt or contest his decision in this class of cases may be appealed from to a board hereby constituted for the purpose, and composed of the surgeon-general of the army, the surgeon-general of the navy, and the secretary of agriculture, and the decision of this board shall be final in the premises.

SEC. 16. That all packages of filled cheese subject to tax under this act that shall be found without stamps or marks as herein provided, and a filled cheese intended for human consumption which contains ingredients adjudged as hereinbefore provided to be deleterious to the public health, shall be forfeited to the United States.

SEC. 17. That all fines, penalties, and forfeitures imposed by this act may be recovered in any court of competent jurisdiction.

SEC. 18. That the commissioner of internal revenue, with the approval of the secretary of the treasury, shall make all needful regulations for the carrying into effect the provisions of this act.

SEC. 19. That this act shall go into effect on the ninetieth day after its passage, and all wooden packages containing ten or more pounds of filled cheese found on the premises of any dealer on and after the ninetieth day succeeding the date of the passage of this act, shall be deemed to be taxable under section 9 of this act, and shall be taxed, and shall have affixed thereto the stamps, marks, and brands required by this act or by regulations made pursuant to this act; and for the purpose of securing the affixing of the stamps, marks, and brands required by this act, the filled cheese shall be regarded as having been manufactured and sold or removed from the manufactory for consumption or use on or after the day this act takes effect; and such stock on hand at the time of the taking effect of this act may be stamped, marked, and branded under special regulations of the commissioner of internal revenue, approved by the secretary of the treasury: and the commissioner of internal revenue may authorize the holder of such packages to mark and brand the same and to affix thereto the proper tax-paid stamps.

Approved June 6, 1896.

During the consideration of this bill before the ways and means committee of the house there were some remarks made that are worthy of careful consideration. In the discussion of the subject of protective dairy laws, the question of class legislation is most certain to be used by the opposition, and during this investigation before the committee, Governor Hoard, of Wisconsin, spoke upon the subject as follows:

> The point that this bill is class legislation is not well taken. It is simply an attempt to legislate against fraud. Filled cheese is an imitation. An imitation is a counterfeit, and a counterfeit is a fraud. We are not asking legislation against a legitimate industry, but against a deception. Filled cheese is conceived in fraud, executed in fraud, and depends for success and sale upon the deception of the honest consumer. To legislate against a fraud cannot fairly be called class legislation. All the dairy interests of the country are asking that congress shall show by appropriate legislation. that it is on the side of honest and legitimate industry and against fraud and deception.

The question whether the coloring of butter and cheese was not a deception, was asked. Governor Hoard replied:

> Butter is not colored to represent something else than butter, while oleomargarine or filled cheese is colored to represent something else than what it is. The coloring of honest butter or cheese is simply a question of taste in color to suit the consumer. In the other case, it is used to deceive the consumer.

Thos. F. Shields, member of the committee of the New York Produce and Mercantile Exchange, discussed the entire subject of filled cheese in a most able manner. His remarks are here given:

I have the honor of representing the New York Produce Exchange, being one of a committee of three appointed by the president of our Exchange at the request of the members present at a meeting held a few days ago to discuss the bill which is now before you. At that meeting resolutions indorsing this bill were adopted and copies were ordered sent to each member of congress and the senate. The members of our Exchange who are engaged in the cheese trade take a very deep interest in this bill, for they feel, in the rapidly increasing manufacture of this substitute for cheese, which is really what this article is and should be called, that it is a question of but a short time before the legitimate industry will be entirely paralyzed, if not completely destroyed.

For many years American cheese was very popular in England and throughout Great Britain and exported from this country in large quantities; and with this continued good demand, together with a constantly growing home trade in all our large cities, prices were well maintained and the manufacturers, and through them the dairy farmers, received a fair return for their product. In our own city, within ten years, we had at one time over forty different exporters whose business was almost entirely confined to the purchasing and exporting of cheese to Great Britain, and many, if not all of these gentlemen, were sent over here by the large importing houses in Liverpool, London and other cities as their agents to buy and ship cheese to them. Unfortunately, within the past few years this has all changed. The filled cheese made its appearance in England, having been shipped over there by some enterprising western dealers as fine, full cream cheese. At first the English buyer was deceived. To be sure the filled cheese did not taste the same to him, nor have the keeping qualities of the genuine article, though for a time the deception was kept up. But gradually it dawned upon the buyer that large quantities of adulterated cheese were being exported from this country and sold to him as pure, full cream cheese; and soon it was discovered that all cheese imported from the United States was more or less suspected of being adulterated. The English dairy farmer was not slow to use this to his advantage, for he had long felt the competition of our fine, full cream cheese, and he was only too glad to be able to discredit our goods if possible. Through their efforts laws were passed in Great Britain compelling, under penalty of the forfeiture of the goods, that all cheese imported into the United Kingdom from the states must bear on the package in plain letters the words, "Product of the United States." American cheese was already discredited in England; there was no longer the demand that there had been; but to more completely discredit and prevent the sale of the genuine article on its merits those laws were passed, so that intending purchasers would be affected by the prejudice against our goods which existed in the minds of the English buyers.

The result has been a continued decrease in our export business. Where ten years ago we had forty exporters in our city ready at all times to buy our goods, to-day we have not over ten. While we exported in 1879 from New York city to England 2,775,800 boxes of cheese valued at over $16,500,000, we have decreased every year, until this year our total exports from the city of New York will not be over 600,000 boxes, valued at $3,000,000, a falling off in the valuation of our exports of over $13,000,000 in seventeen years. When you consider the percentage of this shrinkage it is astonishing—a falling off of over 80 per cent in seventeen years. There must be some good reason for this great decrease in our exports. I do not think I will be contradicted when I say that the explanation of this is the discredit which has been cast on our goods by unscrupulous dealers who have sent the substitute abroad and sold it to unsuspecting buyers as the pure full cream article. The low cost of producing these substitutes and the prospective large profits in selling them as the genuine article have furnished a strong temptation to conscienceless dealers, and thus the evil has grown. It can not be said that the English people are not using as many cheeses as formerly.

Like the English dairy farmer, Canada was not slow to help us along in our decreasing exports. The Canadian government passed laws prohibiting the manufacture for export of anything but full cream cheese. It appropriated large sums of money to foster and encourage the manufacture of cheese among the farmers. It sent into our state and hired at liberal salaries, American expert cheesemakers to teach the Canadian farmers and manufacturers how to reach our high standard of quality.

It went further than this and fitted out perfectly equipped cheese factories on large wagons and traveled from town to town, teaching the farmer how to care for his milk and how to manufacture the cheese, until now, from Montreal to the Detroit river, west, there are thousands of Canadian cheese factories running regularly, not to mention those around Quebec, Prince Edward Island and even Manitoba. Their efforts have borne good results, for while the exports of cheese from Montreal for the year 1879 were 525,000 boxes, valued at $3,150,000, they have increased every year until this year they foot up the enormous total of 2,148,854 boxes valued at nearly $13,000,000. What a tremendous increase in seventeen years; and what a lesson to us!

This cheese all goes to England and is all consumed by the English people. Thus we see that from our export of 2,775,829 boxes valued at over $16,000,000, in 1879, we have dwindled down to a paltry 600,000 boxes this year, valued at $3,000,000; while Canada, from an export of 525,000 boxes, valued at $3,150,000 in 1879, has steadily increased every year until now it has shipped the year just past 2,148,854 boxes, valued at nearly $13,000,000. Canada has increased every year and we have declined, until now there is so little business passing in this article for export that it is almost a waste of time to engage in it.

So far I have confined myself to the export part of the business; but there is also another part of it which has suffered from the inroads of the substitute. The people in the southern states have been, until the past few years, large consumers of our New York state full cream cheese. New York with her splendid fleet of coast steamers leaving our harbor every day, has been the national market for the southern buyer to send his orders to. Until the advent of filled cheese their orders did come here, and it was a large part of the business of the New York merchant to fill them; but this is now all changed. Filled cheese floods the markets of the south now to such an extent that, I am told, in many of the cities it is impossible to buy anything else, as the margin of profit is so much larger in these goods that the dealers are tempted to force the trade on them although by doing so they restrict the sale of the pure goods. In saying the sale is restricted I come to the most important part of my remarks. I have no hesitancy in saying that the consumption of cheese is restricted and diminished by the sale of the substitute. No consumer ever goes to a store and asks for "a pound of filled cheese or a substitute for cheese." He asks for a pound of cheese; the substitute is handed to him. It has all the semblance of cheese in make and color, and he believes it is cheese. When he partakes of it, however, there is no taste of cheese to it. The fine flavor and delicate taste of the pure article is lacking. The result is it is distasteful to him and he condemns all cheese, and he buys no more. Thus the sale of an article which in itself is healthy and nutritious, is discouraged and restricted by the unscrupulous retailer. It may be claimed that these substitutes are sold for what they are. Perhaps they are sold for what they are to the wholesaler, and perhaps he so sells them to the retailer; but the retailer *never* sells them to the consumer for anything but full cream cheese; and here is where all the harm is done and where the real pure goods suffer. The dairy laws of New York state are very stringent and I am happy to say that they are rigidly enforced, and there is no filled or adulterated cheese sold in our market, but our merchants can visit the principal receiving depots of our city any day and see thousands of these filled cheeses unloaded from the cars, many of them branded "N. Y. State Full Cream Cheese," "Fine Cream Cheese," and other misleading brands, piled on the docks awaiting shipment to the south on the various steamers.

Now, Mr. Chairman and gentlemen of the committee, I know that your minds are engrossed with grave matters of state and this bill is but one of the many measures you have to consider; but I want to impress on you that this bill is of very serious moment to the merchants of our city and to the farmers throughout the whole country. The continuation of the manufacture of this substitute for cheese, with the sale of it for the genuine article, means the total destruction of the cheese industry in this country, eventually. I have shown you by figures which cannot be disputed how our export business has been almost ruined; how our southern business has been restricted; and I say to you, gentlemen, it is but the question of a very short time when the legitimate business will be entirely stamped out by this substitute. The bill which is now before you meets with the approval of the trade generally in our city. The members of our produce exchange indorse it heartily, and we ask that it meet with your favorable consideration and approval, and that it will soon become a law, so that this substitute may be sold for what it is, and the consumer be protected against the dishonest practices of the dealer. I thank you, gentlemen, for your patient hearing.

Hon. D. F. Wilber, member of the house of representatives, from New York, was in attendance at the last meeting of the National Dairy Union, and consulted with and received advice from the strong and experienced men of the organization, becoming fully informed of the needs and wishes of the dairy people upon this important subject. He deserves special mention for the persistent and untiring efforts made by him in the interest of this measure.

The output of cheese in Iowa is not large, but no delegation in congress gave this bill more willing, effective and united support than the members from Iowa. Iowa had a representative on the ways and means committee in the person of Hon. J. P. Dolliver, who rendered valuable assistance when the measure was under consideration by that committee, and advocated the passage of the bill reported before the house in the following strong and comprehensive speech:

MR. DOLLIVER: Mr. Chairman, what has been said by the gentleman from Ohio [Mr. Grosvenor] in charge of the bill and by my colleague from Minnesota [Mr. Tawney] makes it unnecessary for me to occupy the attention of the committee in talking about the constitutionality of this measure or about the general character of the article of commerce commonly called "filled cheese." I think the committee understands exactly what problem we have to deal with. So far as I am personally concerned, I intend to speak with absolute candor of the phases of this matter that are involved in the debate. I have nothing to conceal from anybody on the filled-cheese question. I intend to support this bill for three different reasons, each one of them, in my judgment, good and sufficient; and the first reason is that the enactment of the bill will have a tendency to bring into the public treasury additional revenue.

Again, I support the bill because it offers an appropriate legal protection against the adulteration of the people's food. In the process of taxation it identifies a fraud and escorts a notorious swindle into the light of day. [Applause.] You have read the precept of Scripture which exhorts you to take no thought of what ye shall eat or what ye shall drink or wherewithal ye shall be clothed. That Scripture will need a new interpretation unless we can in some way manage to rescue the food and drink and clothing of the people of the United States from the hands of the counterfeiters. As the case now stands neither the clothes on our backs nor the food on our tables nor the common weapons for fighting thirst between meals have escaped suspicion. In this carnival of deceit the rich and the poor alike suffer.

Now, Mr. Chairman, I undertake to say that this world in which we live will not go on permanently under a system like that. It will not go on forever buying coffee grains delicately molded out of blue mud. [Laughter.] It will not go on buying tea that has been generously commingled with the dried leaves of the forest. [Laughter.] It will not go on drinking wine that has been manufactured in a cellar without the intervention of grapes, nor those other and more penetrating beverages that have entered into partnership with such a fatal assortment of explosive chemicals as to greatly facilitate the descent of our fellow citizens, as the old negro preacher expressed it, down the lubricated steps to the opaque profundity of damnation. [Great laughter.]

Oh, but says the gentleman from Tennessee, this is a matter for the states. Well, that is partly true. I admit that it is a matter for the states, and right manfully the states are grappling with the question. But, Mr. Chairman, it is a matter for this house also; and wherever congress can get a legal hold on it, it comes within the jurisdiction of the representatives of the United States. I have great respect for the doctrine of state jurisdiction, though so far as the old-fashioned doctrine of state rights is concerned, the gentleman from Tennessee ought to know that thirty years ago that doctrine was so disabled by a collision with the United States of America that in 1886, on this very question, even the despised American cow was able to kick it into a cocked hat. [Laughter.] That was on the oleomargarine bill. Fortunately for the public health, every principle upon which this bill stands has been already justified at the bar of our highest court. There is not one of those principles that is any longer open to dispute. The business of manufacturing filled cheese is a fraud. I do not mean to say that the manufacturers are all guilty of fraud——

MR. MCMILLIN: Then this bill is not for the purpose of taxation for revenue, but for the purpose of suppressing this business?

MR. DOLLIVER: I am now engaged in telling the gentleman the three things that this bill is for, and before I get through he and the house will understand them perfectly. I do not say that all the manufacturers in the present stage of the industry are guilty of fraud. I will not even go so far as to say that all the wholesalers habitually perpetrate a fraud. But I do say that the evidence is sufficient to show that the business itself is a fraud, and for one I am here for the purpose of looking a little to the rights of the man who orders "Iowa full cream cheese" and is furnished by the wholesale dealer with a spurious and inferior article. I am here looking to the rights of the citizens of this country who go into a store for the purpose of buying cheese and take home with them an objectionable admixture of skimmed milk and soap grease. [Laughter.]

I am speaking here for the victims of the American boarding-house system who eat cheese for the purpose of promoting the digestion of pie, and then have to take another pie in order to secure the digestion of the cheese. [Laughter.] The American dairymen understand this question thoroughly. The dairy commissioner of my own state, Mr. W. K. Boardman, has been especially vigilant in the investigation of this question, and I will read an extract from his letter received this day indorsing this bill and urging the friends of American agriculture to stand by it in exposing the commercial fraud known as "filled cheese:"

> You will be performing a great service to the people of Iowa by championing this bill when it is before the house for final action. I have this day received from the chemist of the experiment station of the Iowa Agricultural college a report of two analyses of samples of cheese which was being sold in this city. The cheese that these samples represent was purchased from Chicago parties by wholesalers here as full cream cheese. The sample of one of the cheeses was branded on the outside in red letters, "Wisconsin full cream." Both samples are pronounced filled cheese by the chemist. Following are the words used by the chemist for the analysis of the cheese marked "Wisconsin full cream:" "From the above result I would say that this sample of cheese was made from milk having its contents of butter fat almost entirely removed and replaced by an animal fat of the nature of lard. It is, in other words, a filled cheese."
>
> I give you this information in order to show no matter how closely this business is watched the dealers at Chicago will, through deception and other means, get their fraudulent goods before the people. With the provisions of the bill now before congress enacted into a law, the branding and stamping of such cheese would at once make known its true character, and no jobber or retailer could then be deceived.

That is the fraud which has become bold and naked in the commerce of this country, which this bill, by the process of taxation, the only jurisdiction we have in the matter, aims to identify and thereby in some degree seeks to arrest.

So far as the licenses and penalties provided by the bill are concerned, nobody need be troubled about them. They are barely sufficient to induce the trade to keep clear of the fraud.

But somebody says here that the real object of this bill is not to raise revenue, nor even to identify a fraudulent article of commerce, but to protect the interests of the American dairy against a new business which injuriously competes with the old one. And that enables me to speak very briefly (for I have only six minutes left) of the final reason that leads me to give my hearty support to this bill.

The morbid researches of modern chemistry have been able to do some very curious things. They have substituted a cheap vegetable oil for the old-fashioned pork fat, and put it upon the American market under the label of "prime steam lard," and at the same time they have taken the animal fats out of milk and substituted neutral animal oils and made two products, one of which for the sake of its color they call "butter," and the other for the sake of its shape they call "cheese." [Laughter.] Now, butter has had friends enough in the past to take care of it and protect it by law with more or less success. The law has been a little more slow in coming to the protection of cheese—probably because many varieties of cheese have been thought able to take care of themselves. [Laughter.] It would seem, for example, that limburger cheese, now safely domesticated in the district from which my friend Sauerhering comes, is endowed by nature with means of defense that require very little assistance from an act of congress. [Laughter.]

It is not necessary for me to deny on this floor that the possible effect of this bill will be to give an advantage to American agriculture. The bill is not objectionable to me on that account. On the contrary, every profound student of human affairs teaches us that agriculture is the basis of civilization itself, and that no possible prosperity can exist in this world under conditions that do not yield to the cultivation of the soil a fair return. So that if a new business, begotten in the laboratory of the chemist, by false pretenses, threatens to narrow the opportunities of the American farm by occupying its market place at home or by destroying its reputation abroad, as my friend from Minnesota indicated, and the law comes in and levies a tax on that new business, it does not alarm me that the tax may operate in some measure, at least, to promote the welfare of the most ancient and honorable occupation of the human race. [Applause.]

One-half the American people live on the farm, and nearly all the rest of them that are worth mentioning were born there. [Laughter.] The general welfare, to provide for which our institutions were established, requires that the food-producing millions should be secure in their pursuits, nor should any adroit imposition, however backed by money, be allowed to take from the farm any portion of its legitimate earnings. "Oh, but," says one, "this business which you are condemning and complaining of has simply taken the butter fat out of milk and substituted lard, therefore this is a fight between the cow and the hog." Now, I happen to represent a state that is first in the production of swine, and first in the production of improved milch kine, and I feel authorized for one to say that the American hog does not ask my friend from Tennessee, who has already, for the sake of cotton-seed oil, helped to drive him out of the lard business—does not ask him to repair the injustice by trying to stick his nose into the butter and cheese business.

MR. MCMILLIN: We ask you to keep yours out of it. [Laughter.]

MR. DOLLIVER: I was making no reference to my friend's nose; but the law, for the protection of the public, proposes to put its nose in because the integrity of the business concerns the American people. I say, give the American cow a fair chance. She has been the faithful servant of man. She landed with our ancestors at Plymouth Rock [laughter]; and, tied behind the old, weather-beaten, emigrant wagon, she has marched, with the household goods of the pioneers who have taken possession of this continent, from ocean to ocean. [Applause.] She has increased and multiplied and replenished the earth, until to-day the industries which she has made possible contribute annually to the wealth of the world more money than the great combinations of modern capital—more than iron and steel, more than lumber and coal, more than cotton and wheat, more than all the looms of New England, more than all the mysterious riches of gold and silver. Yet there are men in this house whom I have heard to-day sneering at this bill who spend most of their time trying to get protection for some insignificant local enterprise, or "talking through their hats" in the silver debate. [Laughter.] I say, give the American cow a fair chance! For myself, I am in favor, Mr. Brumm, of her monopoly—a monopoly that God gave her —in the production of butter and cheese. [Laughter.]

MR BRUMM: Then you ought to encourage the production of her cheese rather than cut it down.

MR DOLLIVER: That is one monopoly that I am in favor of. And if every man in this house, who in the days of his boyhood, got up at daylight to feed the cows and stayed up after dark in order to milk them; if every man who has churned actual cream with a reliable upright churn, and has watched with a boy's enthusiasm the old-fashioned process of making cheese in the days of its honor and repute, will stand by this bill, we will drive from the American barnyard the horde of counterfeiters and cheats at common law and keep them out "till the cows come home." [Long-continued applause.]

In the senate Hon. John H. Gear made a strong speech in favor of the bill, which is here given:

Mr. President, I am certain in my own mind that the article of filled cheese is not so nutritive and healthful as the genuine article of dairy cheese. It is a serious damage to the people of the state which I in part represent. There are a million people in Iowa engaged in farming. They own in round numbers 1,500,000 dairy cows. The value of a large amount of cheese manufactured in that state is seriously endangered by the permission to ship into it from other states the article called filled cheese.

The senator from Ohio [Mr. Sherman] has stated that he does not understand that filled cheese is falsely branded by the persons who manufacture it. I beg to differ with him. It is in evidence, given to me by the dairy commissioner of my state, that filled cheese is shipped into Iowa marked

"First-class Iowa cheese," "Full cream cheese," "Dairy cheese," and so on, and as such it is sold and has been sold in numerous and numberless instances to the people whom I in part represent.

MR. GALLINGER: And it is going on all over the country.

MR. GEAR: And, as the senator from New Hampshire says, it is going on all over the country. Yes; that is so.

Now, I hold myself that when filled cheese comes in conflict with and is sold for the genuine article, as oleomargarine was sold for pure butter, it is wrong. The people who make it have a perfect right to manufacture it if they wish to, but they should be compelled not only by state but by national law to brand it exactly what it is.

The farmers in my state suffer each and every year to the extent of nearly $3,000,000 by the adulteration of lard by the introduction into the manufacture of lard of cotton-seed oil produced in the south. I do not doubt that lard manufactured or adulterated in that way is healthful. I know it is. I know that cotton-seed oil properly prepared is a healthful product; but the fraud comes in in marking it as first-class leaf lard and pure family lard.

It is an evil which my people will not stand if they can prevent it. The result of the manufacture of filled cheese on the farmers of this country is very damaging. A few years ago we exported an immense amount of cheese to Europe, especially to England. Let me call the attention of the senate to a table prepared by a friend in the other house regarding the exportation of dairy cheese. Early in the fifties, sixties, and seventies the United states constantly increased the amount of her dairy products and their exportation. Canada at that time, our neighbor on the north, had but a small export trade in this article. From 1881 to 1885 we exported each year on the average 118,831,685 pounds, while Canada exported 61,502,949 pounds. The export trade from the United States has gone on declining each and every year until 1895, when we exported only 60,448,421 pounds, while Canada exported 146,004,650 pounds. That, it seems to me, shows that it is a damage to the American farmer, and if we can prevent it by legislation we certainly ought to do so, in my judgment.

The result has been that we are falling off constantly in our exports, and the reason why Canada gains is that she prohibits by enactment of her parliament the manufacture of filled cheese or any product of that kind. I think we owe it to the farmers of this country, who are getting so little legislation in these days, and who have got so little in the past, that we should protect them by all means that we can, and should pass the pending bill without amendment.

It is simply, in my opinion, a bill to regulate this industry, not so much for revenue, for revenue is an incident, and I am frank to say that we take advantage of that clause of the constitution which gives us the police regulation of these matters to impose a small revenue, so that congress can control it. I think we should exercise that power in every way we can to protect the farmers. It makes a vast difference to the people of this country. The oleomargarine act has been a great measure for Iowa and a great measure for this country. The value of dairy products in my state one year with another amounts to nearly as much as the silver product of this country, and in one year exceeded the value of silver.

Congress has no right, in my judgment, to strike a blow at the farmers of Iowa and of this country by the non-passage of an act of this kind. The sale of filled cheese has been prohibited by stringent regulations in Iowa, and you can not now buy a pound of filled cheese in that state, notwithstanding it has been shipped into the state in the past and came in competition with our own dairy products, being branded as "Cream cheese" and "Iowa dairy cheese."

REGULATIONS ISSUED BY THE INTERNAL REVENUE DEPARTMENT UPON THE SUBJECT OF FILLED CHEESE.

Regulations for the enforcement of the act imposing a tax on filled cheese, and regulating its manufacture, sale, importation, and exportation, were issued prior to September 4, 1896, the day that the act became a law. These regulations were similar to those made for the enforcement of the oleomargarine law, and such as were necessary to set the law in operation.

The first attack upon the law was made by S. R. Udell & Co., of Chicago, who applied to the department for a decision upon the question as to whether the law permitted the manufacture of filled cheese for export without paying the internal revenue taxes. Section 9, of article 1, of the Constitution of the United States, provides that, "no tax or duty shall be laid on exports from any state." And it was claimed that the provisions of the new filled cheese law were in conflict with the Constitution and could not therefore apply to filled cheese manufactured for export. Acting Commissioner G. W. Wilson, answered attorneys of S. R. Udell & Co., as follows:

Your letter of the 24th inst., has been received concerning your clients, the firm of S. R. Udell & Co., of Chicago, who desire that regulations may be made under which they can export filled cheese without unnecessary embarrassment.

You refer to the provision of section 9, article 1, of the constitution of the United States, that "no tax or duty shall be laid on articles exported from any state," and suggest that, in the light of this provision, it must be assumed that congress did not intend by the said act to attempt to levy any tax on articles so exported.

This is true as to articles actually exported; but a general tax laid on an article in the factory and before its removal therefrom (as in the case of filled cheese by sections 9 and 10 of the act of June 6, 1896) and not levied on the article in the course of exportation, nor because of its intended exportation, is not within the constitutional prohibition. A statement that the article is about to be exported cannot warrant the collecting officer in permitting its removal without the payment of the tax; and he must, thesefore, collect the tax and affix the required stamps to each package upon its removal from the factory, leaving it for the exporter, after the landing of the goods in a foreign country, to furnish proof of such landing and make claim for return of the tax paid thereon, except where there is a special provision (such as that in section 16 of the act of August 2, 1886, with reference to oleomargarine removed for export) for the acceptance of any export bond as to the packages intended for exportation "without payment of tax or affixing stamps thereto." There is no such provision with reference to filled cheese intended for export; and in view of the general provisions of sections 5 and 9 of the act, every manufacturer of filled cheese, even though he manufactures it solely for export, must be required to give bond and pay tax upon all the filled cheese manufactured by him and sold or removed for sale or consumption. Where any such filled cheese is actually exported by him and landed in a foreign country and evidence thereof is in his possession, he is, of course, entitled to submit the claim hereinbefore mentioned, supported by this evidence.

The day before the filled cheese law went into effect, or on September 3d, a more direct decision was received. It held that the filled cheese law does not come under the constitutional inhibition and that claims for rebate, as mentioned in the letter given above, would be unwarranted. Following is the second letter from Mr. Wilson:

With reference to the imposition of tax on filled cheese intended to be, or actually, exported, and particularly to the constitutional provision that "no tax or duty shall be laid on articles exported from any state," I have to say that this office has given the law and suggestions you urge careful consideration.

The language of the supreme court * * * seems to us to admit but one construction. The court says:

> The prohibition * * has reference to the imposition of duties on goods by reason or because of their exportation, or whilst they are being exported. That would be laying a tax or duty on exports within the meaning of the constitution. But a general tax, laid on all property alike, and not levied on goods in course of exportation, nor because of their intended exportation, is not within the constitutional prohibition.

If the supreme court be right in this holding, the filled cheese law does not come under the constitutional inhibition. Whether the manufactured product is afterwards exported or not, it is none the less taxable.

From the language of the case referred to it would seem that it is within the power of the federal government to tax in a mass any article manufactured within its borders, and it is only where special legislation authorizes exports to be exempt from tax that they can be so exempt.

The ruling heretofore suggested that, under the law as it stands, tax is required to be paid on all filled cheese manufactured in the United States must be adhered to.

And even the regulations suggested in my former letter as to claims for rebate of any tax paid would be unwarranted.

This law in regard to exporting filled cheese is much more complete and far superior to the law governing oleomargarine, which permits that article to be withdrawn and tax refunded when exported.

FANCY CHEESE.

There are several forms of fancy cheese offered for sale upon our domestic markets under various names and brands, some of which are made by mixing full cream cheese with one or more of various articles, such as olive oil, cotton seed oil, melted butter, the mixture being flavored with a little wine or brandy. The dairy division of the bureau of animal industry was asked if this class of cheese could be manufactured and sold without complying with the law regulating the manufacture and sale of filled cheese. This division in turn submitted the question to the internal revenue department. The correspondence, together with a circular letter issued immediately upon receipt of the decision by this department and forwarded to all wholesale dealers and jobbers of cheese in Iowa, are as follows:

CORRESPONDENCE DEFINING "FILLED CHEESE."

UNITED STATES DEPARTMENT OF AGRICULTURE.
BUREAU OF ANIMAL INDUSTRY.
WASHINGTON, D. C., September 1, 1896.

Correspondents of the dairy division of this bureau having inquired as to the effect of the recent congressional legislation known as "the filled cheese law" upon the comparatively new industry of putting up good, full cream, factory cheese for retail in various fancy forms and small packages the subject was laid before the commissioner of internal revenue of the treasury department, that official being charged with the execution of the new law and with making regulations for its enforcement.

In reply the following letter has been received, and as the decision thus made is of interest to numerous persons, it is printed herewith for the information of all concerned.

D. E SALMON,
Chief of Bureau of Animal Industry.

Approved:
CHAS. W. DABNEY, JR.,
Acting Secretary.

TREASURY DEPARTMENT.
OFFICE OF THE COMMISSIONER OF INTERNAL REVENUE.
WASHINGTON, D. C , August 26, 1896.

SIR—Your letter of the 10th instant has been received inquiring as to any ruling that has been made by the treasury department with reference to the effect of the "filled cheese" law (the act approved June 6, 1896) on the manufacture of several fancy forms of cheese upon our domestic markets.

You describe this cheese as of "high grade and quality, put up in small packages of paper, wood or porcelain, and sold at high prices," under such names as "Club House Cheese," "Meadow Sweet Cheese," "American Cheese Food," etc., and you say, "While the best New York and Wisconsin state factory cheese is the basis and forms the bulk of these articles, they are variously prepared and contain olive oil, cotton-seed oil, butter fat and whey syrup, always added in very small quantities, and solely for the purpose of improving the consistency of the preparation and its keeping quality. In some cases a little wine or brandy is added to increase the flavor."

There has not been up to this date, a case presented from any collection district with samples of this fancy cheese for examination. But it appears from an examination of the first and second sections of the act of June 6, 1896, imposing tax on "filled cheese," and special tax on manufacturers thereof and dealers therein, that the fancy cheese which you describe must be held to be "filled cheese" within the meaning of this act.

The language is such as apparently leaves no room for any other construction, the definition of cheese in the first section precluding every "food product" from being regarded as cheese except that "which is made from milk or cream without the addition of butter, or any animal, vegetable, or other oils or fats foreign to such milk or cream;" and the definition of "filled cheese" in the second section, requiring that every substance or compound in the form of cheese shall be regarded as "filled cheese" when it is "made of milk or skimmed milk, with the admixture of butter, animal oils or fats, vegetable or any other oils, or compounds foreign to such milk."

To hold that cheese, as it is defined by the first section of the act, may be broken up and manipulated and mixed with olive oil, or cotton-seed oil, or butter fat and whey syrup, even in small quantities, and still be regarded as cheese and not as "filled cheese," would, seems to me be a construction for which it would be difficult, if not absolutely impossible, to find warrant in the plain terms of the statute, and which would inevitably lead to operations tending to the defeat of the "filled cheese" law.

Respectfully yours,

G. W. WILSON,
Acting Commissioner.

D. E. SALMON, Esq.,
Chief Bureau of Animal Industry,
Department of Agriculture, Washington, D. C.

DES MOINES, September 19, 1896.

To Wholesalers and Jobbers of Cheese:

The bureau of animal industry of the United States department of agriculture has been asked to give information pertaining to the manufacture of cheese, with a view to pointing out distinctly what allowances are made for the production of cheese not wholly made from milk or cream without the addition of butter, or any animal, vegetable, or other oils or fats foreign to such milk or cream. As a large number of these inquiries have been received the department of agriculture requested a ruling by the treasury department, bearing upon this subject. This ruling is of great importance to all who are directly interested in the cheese traffic. It will materially affect the manufacture and sale of certain fancy brands of cheese not generally recognized as "filled cheese" as the law will compel all such to be branded "filled cheese."

In addition to the United States government law, in Iowa such cheese must be branded "substitute for cheese" and sold as such, and in no event can it have a yellow or any shade of yellow color. Wholesale and retail dealers should be on their guard, for samples of fancy branded cheese have recently been subjected to chemical analysis and found to be "filled cheese" the sale of which is now prohibited or regulated by both state and national law. They should carefully note the points brought out in the treasury department ruling, a copy of which is herewith given.

Very respectfully,

W. K. BOARDMAN,
State Dairy Commissioner.

By an examination of the internal revenue records, of both districts, we find that no special tax has been issued for the manufacture, sale (wholesale or retail) of filled cheese in Iowa. By request, through the Hon. John H. Gear, United States senator from Iowa, we received the following information relating to the number and location of all special tax issued in the United States under the filled cheese law:

SIR—In reply to the inquiry contained in your letter of the 15th inst., I have the honor to inform you that the following number of persons and firms have been reported to this office as having qualified as manufacturers of, and dealers in, filled cheese, for the fiscal year ending June 30, 1897: Manufacturers 2, located in the first district of Illinois; wholesale dealers 18; located in the first district of Illinois 1; district of Louisiana 15, and sixth district of Missouri 2. Only one retail dealer located in the first district of Illinois has thus far been reported.

Respectfully yours, G. W. WILSON,
Acting Commissioner of Internal Revenue.

It will be seen from this that the law has nearly put an end to this disreputable business, but the profits from the illegitimate sale of this class of goods are so much in excess of what can be made by the handling of honest cheese, that some scheme is likely to be devised, which will deceive the public and enable them to work their goods off on the unsuspecting consumer, and it will be well for all parties interested in the dairy industry to give some attention to the operations of this new law. It will be remembered that those interested in the production and sale of butter congratulated themselves, as well they should, upon the passage of the original oleomargarine law in 1886, but unfortunately gave the subject but little attention, relying upon the law for protection, but finally they realized that the oleomargarine people, by the rapid increase in the manufacture of imitation butter and in spite of the national law, were absolutely destroying and usurping the markets for pure and honest butter, and ruining the dairy interests of this country. This is a lesson which should make it unnecessary for those interested in the maufacture of cheese to pass through a similar experience. "Eternal vigilance is the price of liberty."

CONDITIONS OF THE BUTTER INDUSTRY.

The following is a statement of the number of net pounds of butter shipped to points outside of the state as reported for corresponding periods of twelve months each, ending on the 30th day of September of each year:

1890	71,255,796
1891	68,690,716
1892	60,112,931
1893	54,572,902
1894	54,509,417
1895	66,497,108
1896	80,032,916

The year 1896 shows an increase over the previous year of 13,535,808 pounds, which is the largest increase for any one year of which there is any record in the history of the state. The large exportation of butter made in 1890 has again been reached and passed, besides supplying the increased home demand made by an increase of about 200,000 consumers. This large increase is due, we think, to the favorable conditions existing during the year; the winter of 1895 and 1896 was mild, feed plenty and cheap, the spring early, and the summer months, July, August and September, were favored with sufficient rainfall. Pasturage came on in April, and full grass butter was made early in May; there was but little interruption of the fine pasturage until the frost set in. The increase in the state's shipments for this year was 20.4 per cent, and from figures in the tables in this report we find that there was an average increase in quantity of milk per cow of about 20 per cent as compared with the previous year. These tables do not show any material change in the number of creameries or number of cows furnishing them with milk, and while the gradual improvement in the grade of milk cows may have something to do in increasing the production of butter in the state, we conclude that most of this increase is due to the favorable conditions mentioned. The same condition with which Iowa was favored prevailed to a more or less extent in the entire northwest, except in the arid regions of the Dakotas, Nebraska and Kansas, and a corresponding increase in the output of butter in this large territory was the result. In order to get an intelligent idea of the amount of this increase we obtained the tonnage of butter as reported by the Western Weighing association of Chicago, for the years ending November 1, 1895 and 1896. This tonnage includes all shipments that pass through or originated in Chicago, and is made up almost entirely from butter shipments originating in Iowa, Wisconsin, Illinois, Minnesota, North and South Dakota, Nebraska, and a part of Kansas and Missouri, and when reduced to net pounds it is as follows:

TABLE No. VII.

Showing net pounds of butter forwarded by railways, east from Chicago by months, and for the years ending November 1, 1895 and 1896, and increase for 1896.

MONTHS.	1895.	1896.	INCREASE.
For year	139,815,280	168,903,680	29,088,400
November	8,106,000	8,860,320	754,320
December	8,741,040	9,255,120	514,080
January	11,111,520	12,999,840	1,888,320
February	8,663,520	10,573,920	1,910,400
March	8,697,360	10,550,400	1,853,040
April	7,912,000	10,454,480	2,542,480
May	13,302,240	17,650,080	4,347,840
June	17,359,440	19,619,040	2,259,600
July	16,983,720	20,077,280	3,094,560
August	15,240,960	19,741,680	4,500,720
September	10,516,800	13,944,000	3,427,200
October	13,231,680	15,227,520	1,995,840
Total	139,815,280	168,903,680	29,088,400

In the year 1895, there passed through Chicago for the eastern and export markets, nearly 140,000,000 pounds of butter, and in 1896, about 170,000,000 pounds, making an increase from about the same territory of nearly 30,000,000 pounds, or 21 per cent. The increase by months ranged from 500,000 pounds in December to 4,500,000 in August. The next highest increase was 4,347,840 pounds in May.

The effect of an abundance of cheap feed and mild weather for winter dairying is shown by an average increase of 2,000,000 of pounds for the months of January, February and March. The bountiful pastures and fine fall feed gave an increase ranging from 2,000,000 to 4,500,000 pounds for each of the summer and fall months.

NEW YORK BUTTER MARKET.

TABLE No. VIII

The following table gives the average monthly price of western fancy creamery butter for each month during the last six years, in the New York market, and average price for each month for the six years, and the average price for the entire period.

MONTH.	Twelve months ending Nov. 1, 1891.	Twelve months ending Nov. 1, 1892.	Twelve months ending Nov. 1, 1893.	Twelve months ending Nov. 1, 1894	Twelve months ending Nov. 1, 1895.	Twelve months ending Nov. 1, 1896.	Average per month for six years.
November	.2740	.2590	.3100	.2790	.2510	.2330	.2737
December	.2912	.2887	.3112	.2840	.2440	.2500	.2781
January	.2812	.3075	.3387	.2562	.2519	.2266	.2770
February	.2862	.2975	.2875	.2700	.2394	.2000	.2636
March	.2730	.2665	.2925	.2250	.2670	.2185	.2571
April	.2694	.2869	.3112	.2287	.2000	.1650	.2524
May	.2230	.2125	.2455	.1700	.1785	.1572	.1999
June	.1825	.1944	.2131	1831	.1794	.1550	.1846
July	.1800	.2210	.2160	.1850	.1770	.1505	.1882
August	.2090	.2220	.2360	.2360	.1980	.1571	.2097
September	.2475	.2525	.2750	.2500	.2125	.1600	.2329
October	.3000	.2687	.2941	.2540	.2294	.1850	.2360
Average value per pound for each year	.2520	.2594	.2776	.2350	.2190	.1882	.2378
Average value of butter per pound for the period of six years	......	......	......	......	......	......	.2385

The average price for this year was 18.82 cents, a decrease of 3.08 cents per pound as compared with last year, and 5.03 cents per pound lower than the average for the six years covered by the above table. During the month of July, of both years, prices reached the lowest point and were 17.70 cents last year, and 15.05 cents this year, a decrease of 2.65 cents per pound; 26.70 cents was the highest average price for any month last year, which was in March, and the highest this year was 25 cents in December.

The large increase in the supply, due mostly to the favorable conditions existing during the year, was the principal cause of the low prices. The decline in values during the hard times through which this country is passing is affecting the butter trade as well as other branches of business. The demands of our home market have lessened because of the inability of the industrial classes to buy, but the low prices prevailing has been a stimulus to the retail trade and more butter has been consumed by those having the means to buy than would have been had the prices of former years been asked. The extreme prices realized for fine creamery butter during the winter months in the past is not likely to be repeated in the future, owing to the fact that the growth of the dairy industry and the improvements in the progress of manufacture and the advancements in the training and education of the buttermaker, have materially increased the supply of the higher grades of butter, and the number of persons who can afford to pay high prices for this class of goods has greatly lessened—in other words, the candle has been burning at both ends. There is, and always will be, a class of people in this country who use none but the best of butter for all purposes, and whenever the supply is limited and not equal to the demand higher prices will be paid, but we believe the time has now come when the quantity of first class butter is so large that the high prices realized in 1893, and the years prior thereto, need not be expected.

No doubt the low price of dairy products during the past year has caused the thoughtful dairyman to give the subject much study. The prices of all kinds of farm produce have been ruinouslv low and most of the bountiful crops of 1895 and 1896 still remain unsold in the cribs and granaries throughout our state. The supply of feeding cattle is short, and sickness and disease have killed off a large share of the hogs. Under these circumstances it is not surprising that but little complaint of the low prices of butter and cheese has been heard. This great industry has brought into Iowa larger profits in cash during 1896 than any other department of the farm. The cow, the queen of the farm, has again been the mainstay of the farmer; then our dairy districts are the most prosperous, bank deposits are larger, money circulates more freely, and the people are feeling the hard times less than in other localities of the state. The average price paid for milk and received for butter and cheese, has been the lowest ever known for any year in the history of Iowa since creameries have been established, but the amount realized per bushel from the grain fed to milch cows has been much larger than could have been received for the grain disposed of in any other way, and without question the dairy farmers, as a class, have fared better during the year 1896 than those engaged in other agricultural pursuits.

We do not believe that the dairyman has any reason to feel discouraged when the question of price is thoroughly understood. The large proportionate make of butter of the past year is not likely to be duplicated for some time to come.

The combination of circumstances, the large rainfall, fine pastures, and abundance of feed lasting until late into the fall, and the mild open winter are not likely to frequently occur all in the same year. If the welfare and protection of the industry is well guarded by those who are appointed by the states and national government to watch its interests, there is no reason for the extreme low prices of the past year to continue permanently. The enforcement of anti-oleomargarine laws have decreased the output of that product during the last two fiscal years about 20,000,000 pounds, and the export of butter to Great Britain has reached in the past two years about the same amount,— 20,000,000 pounds,— three-fourths of which which was shipped during the last twelve months. The export of butter to Great Britain for the four years previous to June 30, 1895, averaged about 5,000,000 pounds per year; the expansion of the market from these two sources has been of great assistance in taking care of the large increased production of the past two years. We have endeavored to show that the over-production of the past year was due to a combination of circumstances and that no alarm need be sounded on account of it. But there is another influence at work which should warn us that the permanent enlargement of our butter market is a future necessity; we refer to the growth and expansion of the dairy industry. Other states have been watching the progress made by Iowa in this direction and are now giving more attention to the development of this branch of agriculture. This is particularly true of Nebraska and Kansas, and our rival on the north, Minnesota, is making rapid strides to overtake Iowa, while North and South Dakota are also being developed along this line. The western farmer has discovered that the cost of transportation is making grain farming unprofitable, and that it is necessary for him to ship the products of his farm to market in a more concentrated form. Corn converted into butter is as profitable a way to market it as can be found. Not only has this fact impressed itself upon the farmer, but the railways of the west now realize the absolute necessity of this change in the manner of farming, and are becoming interested in bringing about a better condition of affairs. The Chicago, Rock Island & Pacific railway is making a special effort to encourage the industry in Kansas. Mr. J. Meyer, traveling freight agent for this railway in Kansas, organized a party in May last, consisting of Hon. F. D. Coburn, secretary of the state board of agriculture of Kansas; H. M. Brandt and J. K. Forney, president and secretary of the Kansas State Dairy association, and made a tour of inspection of a part of the dairy districts of Iowa and

Minnesota. By an invitation from Mr. I. Mitchell, dairy agent for the Burlington, Cedar Rapids & Northern railway, I accompanied the party from the time it left Cedar Rapids, Iowa, until its return. Mr. Mitchell had charge of the delegation from that point, covering a distance of 2,000 miles. Mr. E. F. Farmer, traveling freight agent for the Minneapolis & St. Louis railway, over which line we traveled in Minnesota, was one of the party. The dairy press was represented by Mr. Fred. L. Kimball, of the Creamery Journal.

The object on the part of the railway company in this trip was to show the representatives of Kansas the possibilities of dairying and the practical operation of the creamery system in the dairy sections of this country. The Kansas members returned well satisfied with the tour and full of new ideas and enthusiasm for the dairy industry. They are taking hold of the subject in their state and we may expect Kansas to make notable progress in this direction in the near future.

The railways in Iowa having in the past neglected the butter traffic are now realizing its importance and are making efforts to establish creameries along their lines. An official of one of the largest systems in the state, while consulting with us in regard to the matter, said that "Our road has attended to the dairy interests the same as an old lady attends to her knitting—that is, when she has nothing else to do; but in the near future it shall have all the attention and assistance that is necessary to its development along the line of our entire system in the state." There is a large territory in southern and western Iowa that is reached by these roads. How much the developing of new territory is going to affect the supply of butter no one can tell. The population of the country is continually on the increase, but the increase in the number of dairy cows to each 1,000 of population has not varied to a great extent in the past fifty years. There were 275 cows for each 1,000 inhabitant in 1850, and 264 in 1890. The number fell to 232 in 1870, and has not yet reached the maximum number of the earlier times; but while the cow has not been increasing in number per capita, her production of butter has increased nearly 50 per cent in the past forty years. From the United States census we find that the total production of butter on farms (there were no creameries to speak of before 1880) in 1849 was 13.51 pounds per capita of population; in 1859, 14.63 pounds per capita; in 1869, 13.33 pounds; in 1879, 15.50 pounds on the farm, and .58 pounds by the creameries for each inhabitant, and in 1889, the year upon which the last national census is based, production on the farm averaged 16.33 pounds per capita, and that of the creameries 2.91 pounds, making 19.24 pounds per unit of population. There can be no doubt but the improvements that have been going on during the present decade in our dairy herds, by carefully testing the individual members and through select breeding, have, along with perfecting the separator system of conducting creameries, increased very materially the production of butter per capita. The most important question now confronting the dairy business is how to expand the markets for butter so as to take care of the increase and realize a reasonable profit from its production. We can no longer depend wholly upon our home market to consume our entire output. An improvement in quality undoubtedly will increase the amount used per capita in our eastern markets; a return of prosperity, when the industrious and wage-earning classes can again have steady employment, will greatly improve the demand and make prices better, but the most direct assistance in expanding the markets in this country will come with the suppression of the manufacture and sale of oleomargarine. The production of oleomargarine during the last fiscal year amounted to 50,000,000 pounds, every pound of which took the place of a pound of honest butter. The largest part of this oleomargarine was consumed in states having large cities and manufacturing towns. Illinois,Ohio,Pennsylvania,Michigan,Rhode Island,New Jersey, Kentucky, Indiana and Missouri had during the fiscal year ending June 30, 1896, 3,338 retail oleomargarine dealers, out of a total for the United States of 4,380. From these figures it is reasonable to assume that 75 per cent of all the oleomargarine manufactured was consumed in these states. Ohio, Pennsylvania, New Jersey and Missouri have sufficient law, if enforced, to practically redeem the markets in these states for the benefit of honest butter, and successful warfare in the other states enumerated, along with the enforcement of the present laws, would increase the demand for butter over 40,000,000 pounds. The National Dairy Union is organized to assist in all such matters and should have the hearty co-operation of the dairy interests of Iowa, for our state supplies from 30 to 40 per cent of all the butter shipped beyond the state lines in which it is made, but with all the improvements that these changes can make in our home market, there will still be a surplus of butter seeking a market in other countries. This fact leads us to the consideration of this most important subject—our export trade:

TABLE No. IX.

EXPORTS OF BUTTER FROM THE UNITED STATES.

The following are the exports of butter during six fiscal years, with destination.

DESTINATION.	BUTTER IN POUNDS.					
	1891.	1892.	1893.	1894.	1895.	1896.
Great Britain and Ireland	4,993,180	5,915,185	3,869,649	5,488,704	868,815	11,246,611
Continent of Europe	3,515,200	1,834,753	119,978	1,573,056	434,470	3,556,683
British North America ...	944,687	2,251,017	452,819	744,621	369,085	673,341
West Indies and South America................	5,469,039	4,780,253	4,000,588	3,718,636	3,428,036	3,262,124
Other countries........	265,008	266,038	477,073	287,075	498,406	635,424
Total pounds.........	15,187,114	15,047,246	8,920,107	11,812,092	5,598,812	19,374,183

EXPORT MARKETS.

From table No. IX it will be seen that our exports of butter, for the year ending June 30, 1896, was the largest during the present decade, and that the increase was in the amount exported to Great Britain and the continent of Europe. The countries of Europe, not including England, which are our largest customers, are Denmark, which took about 2,000,000 pounds; Germany, 1,000,000 pounds, and Sweden and Norway, 500,000. pounds. Our exports since June 30, of this year, to Great Britain and the continent have been larger than during the same months last year, with prospects of the export for the present fiscal year ending June 30, 1897, being the largest on record. Great Britain has taken, as shown by the table, an average of about 5,000,000 pounds per year from 1891 to 1894, inclusive, when the amount dropped in 1895 to less than 1,000,000 pounds. This large decrease was caused by an unusually large export from Great Britain's colonies, the increase coming mostly from Australia, where the fall and winter of 1894 and 1895 were very favorable.

The rapid growth of the creamery system in that country has made the production of butter one of the principal occupations of her agricultural people. The favorable conditions were reversed last year. Australia was visited by a severe and protracted drouth during her most productive months, and her butter exports to England fell off some 12,000,000 pounds, and the United States increased her exports to England about a corresponding amount. By reference to the table it will be noticed that the exports to the balance of the countries have been very uniform for the last four years, amounting to between 4,000,000 and 5,000,000 pounds; the two years preceding (1891 and 1892), they were between 6,000,000 and 7,000,000 pounds. Great Britain is the largest and most important foreign market for our surplus butter. The consumption of her large population far exceeds her home production. It is stated that her people consume 500,000,000 pounds of butter per year, and her home production is only about 200,000,000, leaving a balance of 300,000,000 pounds to be supplied by other countries. Her colonies, Australia, Canada and New Zealand, furnish about 50,000,000 pounds per annum; Denmark is the largest contributor and ships about 125,000,000 pounds each year; France, 50,000,000 pounds; Germany and Holland, 30,000,000 pounds; Sweden about the same, and the balance of the countries, including the United States, about 30,000,000 pounds. Of this last amount, the United States has furnished an average of 5,000,000 pounds per year, except the last fiscal year, when the conditions mentioned before enabled this country to more than double her exports of butter to England. The United States is a very small factor in supplying this enormous market, and there can be no doubt that the time has come for the dairy interests of this country to take some steps to secure a much larger share of this trade. England is the common dumping ground for the surplus butter of all countries, but her people have definite notions and tastes which must be consulted and catered to if any material headway is made by this country in supplying her wants in dairy products. Our competitors in this great market have been carefully studying for some time its requirements, and by both private and governmental efforts developing the dairy resources of their countries so as to be able to supply the people of England with the particular kind of goods they demand.

DENMARK, NORWAY AND SWEDEN.

Danish butter ranks first in both quality and quantity; the French sells as high, because of the nearness to London it can be placed upon the market a few hours after churning, and is sold to the very fancy trade. Denmark is a small country, her pastures are rich, well supplied with water, her people are very intelligent and thrifty, the herds are high bred, most of them large in number, well cared for and properly fed. The government employs instructors, and the most improved machinery and methods are used in the creameries and by the farmers. The nearness to the English market makes it possible to furnish fresher and less salted butter than would be safe to risk from countries located farther away. The Danish government guards with jealous care the reputation of her export butter. The butter shipped from this country to Denmark is of a cheap grade and used by their own people while the home product is sold at much higher prices. Norway and Sweden supply England with much fine butter. They are not as far advanced in the science and art of butter-making as their Danish neighbors, but are close imitators of them. Sweden has about 1,500 dairies and Norway 300 or 400, and education in dairy lines is being pushed. Government experts are employed to travel around and instruct the people. In Norway it is reported that ten such officials are now engaged in this work.

BRITISH COLONIES—AUSTRALIA AND NEW ZEALAND.

England makes great pretensions of being a free trade country, nevertheless, true to her own interests and those of her colonies, she influences them to look after and encourage such industries, the products of which can find a market in the mother country. While not more than 10 per cent of her foreign butter now comes from her colonies, it was scarcely ten years ago when but little, if any, came from Canada, Australia and New Zealand. Now from these countries she receives from 40,000,000 to 50,000,000 pounds per annum, and each is making great efforts to still farther increase their exports in this direction, encouraged by England in every way possible. The first yearly exportation from Australia amounting to more than 1,000,000 pounds was in 1890, and the increase has been rapid, reaching in favorable seasons as high as 40,000,000 pounds a year. New Zealand began shipping her butter to England about the same time, and while the growth has not been as large, it, nevertheless, amounts to about 7,000,000 pounds per year. The butter from these countries is all made in creameries largely operated on the co-operative plan. The process of manufacturing is about the same as in this country. Refrigerator cars transport it to the seaboard, where it is held in government cold storage: From there it is shipped to England in refrigerators, its temperature being kept near freezing point. Government inspectors visit factorise, enforce cleanliness and proper sanitary methods, and in addition, the government supports experimental schools during the winter and the attendance of all dairy managers is expected. A corps of instructors is also employed whose duty consists in visiting each factory, giving information in new and improved methods. All butter is examined by government inspectors, before being exported, and again on reaching England, and its condition reported by cable to the consignee. That country is well adapted for the production of first-class butter, having healthy cattle, a mild climate, good pastures, modern creameries, and the industry is fostered and encouraged by the government.

CANADA.

The Canadian government is alive to the benefits to be derived by her people from a prosperous and growing dairy business, and has adopted a plan for assisting localities in establishing creameries by loaning money for the building and equipping of factories and assuming charge of the management, manufacturing and selling the output at a small cost per pound to the patron, advancing two-thirds of the value of milk delivered at the end of each month and making full settlements after returns for the month's business have been received from England. A sinking fund is created by taking 1 cent per pound on the output to be applied in liquidating the government loan, the government continuing in control at least three years unless the loan is repaid sooner. Canada has discovered that the English people like fresh goods, and the government is assisting in establishing refrigeration at the creamery, on the railway lines and on steamship, so that Canadian butter can be delivered in England as fresh and sweet as possible, to compete with Denmark and other continental countries. The dairy commissioner of Canada has a large corps of assistants whose entire time is devoted to the improvement of the dairy industry. The steamship lines from Montreal reserve their refrigerator space for Canadian shippers, and shipments from the states are not taken unless the room is not all engaged for Canadian butter.

It will be seen that those countries having but a small home market have been compelled to conform to the demands and tastes of the people of England in order to dispose of their butter at fair prices. The dairy people of the United States must soon learn, if they expect a business of any magnitude with Great Britain, that it is absolutely necessary that the demand of the English market in regard to quality, color, salt and package be recognized, and that the most approved methods of transportation across the ocean shall in some manner be at the command of our exporters. A system of trade-marks, and a system of government inspection for their protection should be established.

DEMANDS OF THE ENGLISH MARKET.

QUALITY, COLOR AND SALT.

The English trade requires for table use pure, sweet butter, but not the fancy, high-flavored article that the larger markets of this country demand; the butter must be of good grain, solid and free from an excessive amount of water, which is considered in that market an adulteration; the salt must be mild, not more than 60 per cent of the amount in general use in this country, and the color much less than is the custom here—a pale yellow is all that is required. June butter should be free from any artificial color, as high colored and heavily salted butter is not wanted, and even if of good flavor will not command a fair price, but will severely injure the reputation of the American product.

PACKAGE.

The Australian box is in great favor in England as a package for fine butter. It was first introduced by the Australian shippers, as it is nearer air-tight than the tub, and the shape permits it to be stored in the refrigerators of the ship in a more compact form, and economizing space. The appearance of the butter on the retailer's counter after the package has been stripped of its contents pleases the dealer and his customers. This style of package for table butter has a firm hold in the English market, and we are unable to see why its introduction in our home markets should not be as well received if proper pains are used in the manufacture of the box and by dealers in showing its advantages. The butter comes from this package in a square form and can be divided and sub-divided, keeping the same shape until it reaches the table, avoiding loss by crumbling and waste, and always presenting an attractive appearance. A box should be practically twelve inches square and twelve inches deep, inside measurements. If slightly larger at the top than the bottom, it would assist in stripping the package from the butter. The butter should be so packed as to weigh, when stripped and placed upon the scales in England, just fifty-six pounds, which is one-half of an English hundred weight, and is one of the things which the English trade particularly demands. These boxes are made of a peculiar white wood grown in that country; we can see no reason why the white wood or spruce of this country will not answer every purpose and make a perfectly satisfactory package. Each package should be lined with heavy parchment paper; none but the best quality should be used. The advantage of paper lining is to make the package more nearly air-tight, keeping the butter sweet and allowing the sides and bottom to be free from any wood taste or odor. The parchment paper prevents bleaching, sticking to the wood and loss in weight, all of which places the butter in the hands of the retailer in better condition, adding materially to its value. When tubs are used, its use is just as essential, as the same advantages will be gained. For the lining of boxes we see no reason why parchment paper cannot be made in such a shape so that it may be cheaply and easily handled, and when required for use be unfolded in the shape of the package and slipped into it snugly, fitting close to the bottom and sides, leaving sufficient length above the butter so that when folded over it will cover the top. This particular form would be more convenient to handle, nearer air-tight, and would reduce the shrinkage to a minimum, and the package would be delivered in a dryer and cleaner condition. The importance of this style of package being adopted for export use cannot be overestimated. During the present season boxed butter sold for from two to three cents per pound more than equally as good in tubs.

These are the conditions with which this country will have to comply if we successfully meet the competition in the English market. There can be no doubt but what the conditions in this country as to grade of cows, richness of feed, and skill in manufacturing are equal to those of any country.

The present creamery system in this country has developed under peculiar circumstances. Before 1880, this great country was supplied with butter wholly from the farm; its quality was generally poor, and that portion of it sent to the eastern cities was first sold by the farmer to the storekeeper, and by him shipped to a packer, where it was reworked and shipped, reaching the eastern consumer through the commission men in the large cities. This class of butter never gave satisfaction, but was the best that could be secured in sufficient quantities to supply the trade. It was under these favorable conditions that the creamery system came into existence. The demand for fine creamery butter was so great that high prices were paid for it, and the creamery manager had no trouble in disposing of his product. The agents of the large commission houses solicited his consignments at the creamery door, and the question of looking for, or preparing his goods for other markets than that of our own country, had never entered the minds of most of our creamery managers. Managers and butter-makers in this country have been guided to a large extent in the matter of quality, salt, color and style of package, by the demand of the eastern market, which advice has usually been received through their respective commission merchants.

Shipments are made by most of the creameries weekly to New York, Chicago, Boston, Philadelphia, or some smaller market, and advice is received weekly, with instruction if any change in manner of producing goods is desired. Most of these shipments are small, and it is an accident if the quality of any of them will answer the requirements of the English market for table butter.

There was a time in the history of our creamery system when large factories operated on the gathered cream plan had an output during the flush of the season of a carload of 20,000 pounds, in not to exceed ten days. This made it easy for the middleman or speculator to secure long lines of fresh goods of uniform quality from one party, but this class of creameries are now few in number; they have given way before the rapidly moving idea of co-operation which is taking a strong hold of the farmers in the creamery territory of the west. The advent of the separator made the co-operative system possible, and resulted in the multiplication of smaller whole milk factories, several of which do not produce as much butter per day as one of the gathered cream plants of former days.

The average production at the present time of the Iowa creamery is from 400 to 500 pounds per day, or 3,000 pounds per week, which is manufactured and sold generally for immediate use; therefore, it is with much difficulty that the exporter can secure enough butter of uniform quality, salt and color, to say nothing of package, to make a fair sized exportation to the English market. The fact is, that with the exception of a few shipments made in 1896, no manufacturer of fine creamery butter has made and prepared any butter especially for the English market.

The result has been that our fine grades of creamery butter have not been exported, unless a shortage caused by failure of some other country to send England its usual supply of table butter, made it possible for our exporters to place our fancy brands in that market. This was done during the fall and winter of 1895, owing to the short make in Australia, and has been continued to a small extent the past fall, but the largest part of our exports to England in the past has consisted chiefly of ladles and low grade creameries, which were sold to bakers and cheap trade in general; this is not an envious position for this country to occupy with the butter trade of England, but is, nevertheless, true.

The exporters of New York and Boston have been asking for fine butter suitable for the English market, but have received only a limited supply, and what they have bought has been at reduced prices, and sold in London at correspondingly lower prices compared with that from other countries. It is difficult to understand how this matter could be otherwise when we consider that no one in this western country has made a business of manufacturing butter for exportation, neither can they afford to do so. Not being in a position to judge of the conditions of the foreign market, and knowing that butter put up for the English market will not meet with favor with the dealers and consumers of our eastern states, still we have noticed for some time a gradual change going on in this country in favor of lighter colored and milder salted butter, and it is within the range of possibilities that such changes will take place in the tastes and notions of the people of this country so that the particular butter desired by our English cousins will be acceptable by our own people.

The more perfect refrigeration, and the absolute freezing of held butter, makes heavy salting unnecessary, and the question of color is merely a fad, but we can not afford to wait for such gradual changes in order to supply suitable butter for shipments to England on which to build up a reputation and establish a permanent trade. It would seem that this important matter should be taken hold of and something done in this direction during the coming season. There are three months during the year that Australia does not ship butter to England, and four more in which her shipments are comparatively small. The butter season in that country begins with September and closes in May. The first shipments arrive in London during the latter part of October, and the last shipments reach England in June. The factories of that country are closed in June, July and August, their winter months, and but little butter is shipped in the first and last two months of the season, namely, September, April and May.

The markets of Great Britain are practically free from Australian butter from the month of May to November, and it would seem that under the proper arrangements we should export to England some of the large surplus of our factories during the summer months, in place of putting it in cold storage to be a factor in establishing prices later on the fresh made goods. This can be accomplished in two ways: The large increase in this country should take the lead. It is only those having a large county to collect milk from, or have several skim stations furnishing them with cream, that can take the risk. The output of such factories is large and the management has complete control of the manner of manufacturing and all requirements of the English market can be met with, and also sufficient attention given to the matter so that the undertaking will meet with success.

The second method is for the exporters or speculators to contract for the make of several creameries, and have a suitable person superintend the manufacture and packing for all of the factories, insuring a uniformity of quality, salt, color and packing, thereby getting control of a *long line* of goods suitable for the desired market. If the exporter or speculator has absolute control of the making and packing of the butter, he can cater to the distinctive requirements and notions of different foreign markets, as the cities of England and the continent differ in this respect the same as do the markets of our own country. It is absolutely necessary that we consult the wishes of the customers if we succeed in establishing a permanent demand for our goods in England or in any other country. In addition to procuring a supply of butter suitable for export, there is the question of quick and safe transportation that must be arranged. The transportation facilities from the west to the seaboard are very satisfactory, the different fast freight lines furnishing rapid transit and good refrigeration, and if the factories are able to put their butter into these refrigerators in suitable condition, it will arrive at the seaboard in first-class order. Our export trade in the past has not consisted of fine goods, and suitable provisions have not been made for the handling of first-class butter after it arrives at the seaport and before it is placed on shipboard. First-class cold storage must be provided by the fast freight lines or ocean steamship lines, or by their joint action. The refrigerator service of the trans-Atlantic steamers are confined to two or three lines, and is altogether too meagre to take care of such an export trade as the dairy industry of this country demands should be built up. The kind of butter that has been sent to London, Liverpool, Glasgow and other cities of Great Britain, and the shipping of much of it outside of refrigerators, has given American goods a very poor reputation in these markets, and created a prejudice in England against butter from the states. It has only been during the last two seasons that any of our fine creamery butter has reached the English market in reasonably fair condition. Rates should be established by our fast freight and steamship lines for the through shipments of butter from the creameries of the west to the principal cities of Great Britain and the continent, and a guarantee made that such facilities in the line of refrigeration would be provided, and such care in handling be taken, that the goods would arrive in Europe in as fine shape and practically as fresh as when they left the factory in Iowa or the west. This has been accomplished for the butter of Canada and Australia by the aid of their respective governments, and butter is sent from the factories of Australia on a voyage of some five or six weeks and across the tropical zone held at a temperature near freezing point during the entire time, and arrives in the English market in a fresh and sweet condition. The government of Australia subsidizes the steamship lines furnishing this excellent refrigeration. The Canadian government has discovered the necessity, in competing with their remote sister colonies, of thorough refrigeration and is now assisting the steamship lines that transport butter from Montreal in providing it for the use of the export butter of the Dominion. How far our government can go in this direction we are unable to state, but what can, should be done. The entire subject of foreign exportation of dairy products should be taken up by the department of agriculture and the co-operation of other governmental departments secured wherever necessary to enforce our methods and protect and advance our interests. The agricultural department, so far as the dairy industry of this country is concerned, has been conducted along educational and scientific lines, and while we are not making any criticism of the class of work done, we do believe that the time has now come when the commercial side of this great industry should have the attention and assistance of this department of the government. Some system of inspection and branding of our export butter should be devised in order that the low grades will not stand in the way of building up a reputation for our fine butter. We need a national law regulating and governing the use of trade-marks. This country is exporting about 5,000,000 pounds per year of oleomargarine, and undoubtedly it is being sold for American butter and ruining the reputation of one of our most valuable products. This should be prevented as much as possible. Special agents from the agricultural department should be constantly at work guarding and encouraging the dairy interest and preventing frauds being committed in its name.

There is a large surplus of farm butter made each year that is bought by packers, reworked and put upon the market under the names of ladles, factory and imitation creamery, and in many instances the word "imitation" is omitted, and it is palmed off as creamery butter. This class of butter has always been with us, but it is growing proportionately less each year. Our government regulations should be so strong that it could only be exported for what it is, and under such conditions so as to reach the consumer under its true name, and to not injure the reputation of our fancy creamery butter. Our creamery people know but little about the question of exporting butter, and no doubt the agricultural department could take the matter up and ascertain facts and gather information that would be of much value to our dairymen. The exports which now amount to between 4,000,000 and 5,000,000 of pounds of butter per year to countries other than Europe, principally to Central and South America and West Indies, should have some attention by the government, and it will probably find that by honest dealing and catering to the various demands of these countries we could increase this trade many fold and probably find a market for much of the surplus cheaper grades of butter which we are obliged to dispose of in some other manner. It would now seem as if our government could act along these lines and materially aid the dairy people of this country in establishing new markets for the rapidly increasing surplus. The great dairy interests of this country are largely located in northern states and are carried on by an industrious, thrifty people. They have believed in and upheld for many years the theory of home protection that has been the policy of this country most of the time for the past thirty years, and have rejoiced to see the industrious and manufacturing sections of this country develop and grow rich, and have borne without a murmur any additional burdens that the policy may have inflicted upon them. They are not unmindful of the favors shown them in the support of experiment stations and agricultural and dairy schools by the government, such as has made it possible for Professor Babcock to give to the dairy industry the milk test that bears his name, which has revolutionized the entire creamery system as effectively as did the cotton gin change and advance the production of cotton. They feel that such good use has been made of all the aid so far furnished by the government that the supply of their products has outgrown the markets of this country and they now believe that a share of its revenue should be used in developing other markets, so that this important industry can be carried on at a fair profit, and permitted to grow and flourish.

IOWA CREAMERIES.

In another part of this report will be found tables No. X, XI and XII, and creamery list, and the following information is gathered from the compilation:

Ninety five counties in the state have one or more creameries within their borders. Appanoose, Fremont, Monroe, and Woodbury are without creameries; Harrison county in the last report had no creameries, but now has 2; Decatur with 2, and Des Moines with 1 to their credit last year, are now among those without creameries. As compared with last year's report there are 36 more creameries and skim stations, which would indicate an increase larger than facts justify, for a number of skim stations not reported in the last report are now included in the total number of 810 creameries and skim stations. Since our last annual report there have been 69 creameries and 19 skim stations, a total of 88, built in 48 counties, and 29 remodeled in 23 counties. Twenty creameries, located in 14 counties, have burned; 9 of this number have been rebuilt and are included in the number reported as built.

Of the 810 creameries in operation November 1, 1896, 424 are conducted by individuals, 81 by stock companies, and 304 on the co-operative plan. As compared with the last report there are 43 more individual plants; 28 more co-operative, and 35 less stock companies. Of the 810 creameries and skim stations, 725 are fully equipped creameries, manufacturing butter, and 85 are skim stations, where only milk is received and the cream separated and delivered at the main factory.

Of the total number of creameries and skim stations, 641 are operated as separator, 95 as gathered cream and 74 as combined separator and gathered cream. This is a decrease from last year of 31 gathered cream plants and 33 combined, and an increase for the separator system of 101. This, however, includes the skim stations, about 20 in number, which were in operation last year and not reported to this department, therefore the net increase in number of separator plants would be about 81.

There are 715 creameries and skim stations receiving milk; 573 receive on the test plan, which is according to the amount of butter fat the milk contains; 127 receive by the hundred weight; 15 make no report. This shows a rapid change in the right direction, as there is a large increase of creameries adopting the test plan.

The information in these tables, such as number of patrons, number of cows, and amount of butter made, etc., is based upon the number of factories; a skim station is but a feeder for the factory. All information belonging thereto is compiled with that of the factory with which it is connected.

Butter is manufactured in 725 factories. Of this number, 563 report having 60,944 patrons and 517,503 cows, which is an average of 108 patrons and 919 cows for each creamery, and an average of 7 cows for each patron. Taking these figures as a basis, there would be for the 725 creameries 78,300 patrons and 666,275 cows.

Three hundred and sixty-six creameries report on the numerical condition of dairy herds as compared with last year; 203 report an increase in the number, 103 as having no change and 50 as decreasing.

Five hundred and sixteen report the value of their plants as $2,083,705, which is an average of $4,038 for each creamery. This would show a valuation for the 725 creameries of $2,927,550. Eighty-three skim stations report a valuation of $127,150, an average of $1,532 each, and the 85 would be $130,220, making the total valuation $3,057,770 for the 810 creameries and skim stations.

Of these factories, 658 report on the time operated during the year. Five hundred and sixty were in operation the entire year, 78 six months or more, and 20 less than six months. The average time for those reporting is 10.4 months.

For the year ending May 1, 1896, the information pertaining to the number of persons employed and amount of wages paid is as follows: Six hundred and forty-six creameries report having 646 butter-makers. Wages paid for different seasons of the year: Winter months, $41.30; summer months, $52.66, but when employed for the entire year the average permonth was $51.82. The total amount paid butter-makers by the creameries reporting was $459,875, which is a yearly average of $711 for each butter-maker. At this ratio the 725 creameries paid $515,475 to butter-makers. There were reported 354 first assistants, with average monthly wages of $27.80, and 37 second assistants, $30.05. The latter were employed usually a short time during the season when the receipts of milk or cream were especially large. The total amount paid assistants is $99,520, which would be $154 for each creamery and skim station, or $124,740 for the 810 creameries and skim stations, making a total of $640,215 paid to help for inside creamery work.

The 411 creameries report 2,520 persons engaged in collecting milk and cream, which would be an average of 6 to each, or 4,860 for the 810 creameries and skim stations. Three hundred and twenty-nine creameries report $585,820 paid for the collection of milk and cream. This is equal to $1,780.60 for each creamery and skim station, or $1,442,286 for the 810 creameries and skim stations. If to this amount be added $640,215, the sum paid for inside help, we have a total of $2,062,501 as paid for all employes. Milk for the greater number of creameries and skim stations is delivered without direct compensation by the patrons, otherwise the amount paid for collecting milk and cream, and the amount paid all employes, would be much larger. The cost, either direct or indirect, connected with the delivery of milk and cream to our factories, is one that deserves more attention than is usually given it. How to have the milk reach the factory to be converted into butter or cheese, at the lowest possible cost to the farmer, is one of the questions of future dairying that must be solved. It now costs, where milk is not delivered by the patrons themselves, more per pound for collecting it than the cost of transportation of the butter manufactured to our eastern markets and the expense connected with its sale.

AMOUNT AND VALUE OF THE OUTPUT OF IOWA CREAMERIES.

On May 1, 1896, there were 715 creameries and skim stations where milk was received. Of this number 630 were fully equipped creameries and 85 were skim stations. Four hundred and seventy-nine report on the number of pounds of milk received, which is 1,006,964,031 pounds, or 2,102,221 pounds per factory. With this as a basis, the 715 received 1,503,088,015 pounds of milk. There was reported made, from the milk received by the 479 factories, 44,324,279 pounds of separator butter, requiring an average of 22.7 pounds of milk for each pound of butter.

The total number of creameries where butter was manufactured was 725. Five hundred and sixty of this number report the pounds and different kinds of butter manufactured for the year ending May 1, 1896, to be: Separator, 44,224,294 pounds; gathered cream, 11,954,978 pounds, and 1,452,770 pounds of combined separator and gathered cream, making a total of 57,732,040 pounds. Of the total amount manufactured, the percentage of each kind is as follows: Separator, 76.8 per cent; gathered cream, 20.7 per cent; combined, 2.5 per cent. If the total amount reported manufactured by the 560 creameries is to be taken as a basis, the average amount for each factory is 103,092 pounds and a total for the 725 factories where churning was done, 74,741,700 pounds. Seventy-six and eight-tenths per cent of this amount, or 57,401,626 pounds, was separator; 20.7 per cent, or 15,471,532 pounds, was gathered cream, and 2.5 per cent, or 1,868,542 pounds, was combined separator and gathered cream.

The 560 factories report the value of the output for the same period to be $10,207,646.88, or equal to an average of $18,227.94 for each, which would make $13,215,256.50 for the 725 creameries. This amount divided by the total pounds of butter manufactured gives a valuation of 17.7 cents per pound, net, at the creamery.

It may be of interest to know what disposition was made of this vast production of butter. As reported by 572 of the manufacturing plants, 1,917,372 pounds was furnished to their patrons; 1,759,792 pounds was sold in Iowa markets, and 54,000,876 pounds was shipped to points outside of the state. Further consideration of these figures shows that an average of 3,446 pounds was sold to the patrons of each of the 572 factories, and likewise an average of 3,076 pounds was sold in Iowa markets, and an average of 94,407 pounds was shipped to points outside of the state by each of the factories reporting. Upon this basis 725 factories furnished 2,498,360 pounds to their patrons; 2,230,100 pounds to markets in Iowa, and 68,445,750 pounds to outside markets. By adding together the estimated number of pounds of gathered cream butter (15,471,523) and the combined separator and gathered cream (1,868,542), and allow twenty-five pounds of milk as a basis for each pound of butter, we have 433,507,825 pounds of milk required to produce this amount of butter, and by adding the pounds of milk used in the manufacture of separator butter (1,503,088,015), we will have 1,936,589,840 as the total pounds of milk manufactured into creamery butter during the year ending May 1, 1896.

THE IOWA CHEESE INDUSTRY.

The production of cheese in Iowa has made but little progress for a number of years. Most of our farmers prefer to sell their milk to the creameries, where they can have returned to them the separator milk and buttermilk for their calves and hogs. The hog is one of the greatest live stock interests of this state, and barring disease, is very profitable to the farmer.

Tables XVIII and XIX, and the cheese factory list in another portion of this report gives information from which the following is a summary: There are 71 cheese factories reported in the state. Last year there were 81, showing a decrease of 10. Of these 71 factories, 15 of them manufacture butter as well as cheese. The 55 factories reporting give the total amount of cheese manufactured by them for the year ending May 1, 1896, as 3,187,186 pounds, or an average of 57,950 pounds for each factory. Taking these figures as a basis, the 71 factories made 3,916,450 pounds, and of this amount 84 per cent, or 3,289,818 pounds, was sold in Iowa, and 16 per cent, or 626,632 pounds, was shipped outside of the state.

The 55 factories report the value of their cheese as $272,342.28. On this basis the value for the output of the 71 factories was $334,656.48, making an average value of 8.55 cents per pound.

The 55 factories reporting received 30,797,697 pounds of milk, the average per factory was 559,958 pounds, and would make a total for the 71 factories of 39,757,118 pounds. The milk received at the 55 factories made 1,231,655 pounds of cheddar and Young America, 116,745 pounds of Swiss, 99,000 pounds of limberger, and 1,739,786 pounds of which the variety was not designated. It required 10.16 pounds of milk in the manufacture of a pound of cheese. There were 58 factories reporting upon the value of their plants, and the amount was $98,000, an average of $1,691, and an investment of $130,061 for the 71 factories.

There are 38 counties having cheese factories, and the largest number in any one county is 12, which is that of Monroe; Humboldt has 5 factories, Appanoose 4, Johnson, Sac and Wayne have each 3, while nine other counties have each 2, and the remaining 23 but 1 each. Of the 55 factories reporting, 40 pay for milk by the 100 pounds and 15 by the test. It will be seen from this that there is not much improvement among the cheese factories in the manner of receiving milk, for most of them do not seem disposed to adopt the Babcock test in connection with their business. Of 60 reporting, 26 operate the entire year, 28 six months or more, 6 less than six months, making an average for the 60 of 9.4 months.

Sixty-two of the factories report having 62 cheese-makers, 29 assistants, and 91 employed in collecting milk, making a total of 183 employed in the 62 factories or about 210 in the 71 factories.

There are 53 factories reporting 1,540 patrons and 16,150 cows, an average of 29 patrons and 305 cows per factory. On this average 71 factories had 2,059 patrons and 21,635 cows, which is 10.5 cows for each patron. There are but three factories reported built during the year and one as being remodeled.

These figures do not indicate that the cheese industry is making any material progress in Iowa, but the cheese business of this country has been going through that demoralized condition on account of filled cheese that the butter industry suffered a few years ago from the unrestrained sale of oleomargarine. The outlook for its future is much brighter since the passage of the filled cheese law that became operative on September 4, 1896. Reports indicate that the business is picking up and that American cheese is finding a profitable market across the water in England.

The great injury to the business caused by the filled cheese frauds in the past few years closed a large number of cheese factories in Wisconsin, New York and other states, and many of them, especially in Wisconsin, were changed into creameries. But it is to be hoped that the honest cheese-maker now has sufficient protection so that he can afford to reopen his factories, or build new ones, and pursue his honorable calling with a benefit to the cheese consuming public and profit to himself.

We have no reliable figures on the question of home consumption of cheese, but from the returns made by our cheese factories, there is but about one and one-half pounds of Iowa cheese consumed annually, per capita, by the people of our state. There is certainly a large market in Iowa for home-made cheese, and where the conditions are favorable, as much, if not more profit can be had in the production of cheese than by converting the same amount of milk into butter, and it would seem that the low price of butter would be the cause of establishing more cheese factories in some of our large dairy districts. The people have been fed upon such vile stuff when demanding full cream cheese that the appetite for cheese, in a great measure, has been ruined. We believe, however, with the return of first-class goods and better times the demand for cheese will be ample to take care of a much larger portion of the milk of the cows of the American dairyman, and assist more than it has in the last few years in sustaining the dairy business and in guaranteeing a reasonable profit.

WHERE IOWA CREAMERY BUTTER IS SOLD.

The amount of butter shipped annually from Iowa has been reported by the railway companies to this department from year to year since 1890, and includes all grades of butter, but never before has this department collected information showing the amount of creamery butter shipped to the different markets of this country. The creamery managers of the state were asked, upon blanks furnished them by this department, to report: "What amount of butter was shipped to the following markets: New York, Chicago, Boston, Philadelphia, Pittsburg, Cincinnati, Washington, D. C., Pacific coast, and other cities." In response, 455 creamerymen reported, and table No. XIII was compiled from their answers.

It would seem that every creamery should have a system of bookkeeping, so that this information could be furnished without much trouble, and the total shipments obtained from the entire state without having to estimate for a large number of creameries. I have been informed by many creamerymen that hereafter accounts will be so kept, that not only this, but other information needed, could be satisfactorily given.

The combined shipments, from the 455 creameries reporting, were billed to the following cities:

CITY AND STATE.	NET POUNDS SHIPPED.
New York, N. Y.	30,296,633
Chicago, Ill.	5,580,298
Boston, Mass.	5,307,350
Philadelphia, Penn.	1,543,939
New Orleans, La.	277,544
Cleveland, Ohio	270,532
New Haven, Conn.	159,474
Pittsburg, Penn.	147,106
Elgin, Ill.	145,979
Pacific coast (Cal. and Oregon)	142,880
St. Louis, Mo.	125,906
Cincinnati, Ohio	49,579
Washington, D. C.	40,226
Moline, Ill.	39,618

CITY AND STATE.	NET POUNDS SHIPPED.
Galesburg, Ill.	38,900
New Bedford, Mass.	28,500
Newark, N. J.	20,788
Butte, Mont.	18,000
Anaconda, Mont.	12,636
Rock Island, Ill.	9.876
Aurora, Ill.	4,233
Detroit, Mich.	3,540
Blockton, Mass.	1,500
Total	44,264,108

From these figures we calculate that New York received 68.6 per cent of the creamery butter shipped from Iowa during the year ending May 1, 1896; Chicago, 12.6 per cent; Boston, 12 per cent; Philadelphia, 3.4 per cent, and all the other cities combined, 3.4. The average number of pounds for each creamery reported is 97,284. At this rate the 725 creameries of the state shipped 70,530,800 pounds. If the balance of the creameries, not reported, divided their shipments in the same proportion as those reported among the cities named, the amount received in the principal ones was as follows:

CITY.	PER CENT.	NET POUNDS RECEIVED
New York	68.6	48,384,129
Chicago	12.6	8,886,881
Boston	12	8,463,696
Philadelphia	3.4	2,398,047
Other cities	3.4	2,394,047
Total		70,530,800

The creamery butter of Iowa was shipped direct into but fourteen out of the fifty-one states and territories, but without question large quantities were re-shipped from New York, Chicago, Boston and Philadelphia into the cities and manufacturing towns of the middle, eastern and southern states.

From the data in table No. XIII it may be seen that we have but four large markets for our Iowa butter, New York standing far in the lead, with Chicago and Boston almost a tie for second place, and Philadelphia fourth.

The 455 creameries reporting on these shipments are located in 83 counties of the state, thus showing that the information obtained covers almost the entire state. New York receives shipments from 79 counties, Chicago from 74, Boston from 47 and Philadelphia from 39. None of the other cities receive shipments from more than 4 counties.

There were about 10,000,000 pounds of dairy and ladle butter shipped from Iowa the past year. Of this amount probably 8,000,000 or 9,000,000 pounds was ladle butter and the balance dairy goods made and shipped by the individual farmers. The ladle stock was largely sent to the eastern markets and the dairy butter found a market in Chicago and other western cities.

IOWA MILK AND THE BABCOCK TEST.

The information in table No. XIV has never before been compiled by this department, nor do we know of any figures of this kind having been gathered on so large a scale by anyone, and we trust these will be of considerable interest to the dairy people. This office has received many inquiries asking what should be the proper test for milk delivered to creameries at different seasons of the year, and to what extent and for what reason the tests of milk differ from month to month.

These inquiries were so numerous that we decided to ascertain from the best source possible some information pertaining to this subject, and in the blanks forwarded to all the creameries we asked the managers having records of tests made for each month during the preceding year, for a report upon this question.

One hundred and ninety-one creameries, located in fifty-five different counties of the state, complied with the request and it is to be regretted that more were not able, or did not consider it important enough to make the report. Some sent a report for different months, but only those could be used that reported for each of the twelve months.

Sac county, with four creameries reporting, has an average test of 4.06 for the twelve months and ranks first. Bremer, with seven creameries reporting, has an average test of 4.02 and ranks second, and Chickasaw third, with nine creameries reporting, and a test of 4.01. The lowest average is from Audubon county, with two creameries reporting, and a test of 3.46, exactly one-half pound below the highest. Clarke and Clay counties, with one creamery reporting in each, have a test of 3.50, and all other counties reporting and not mentioned above have an average test above 3.50 and below 4.

The average test of all the creameries reporting in the fifty-five counties for the twelve months is 3.84. If 15 per cent is allowed for salt, water, etc., the average yield of butter for 100 pounds of milk for the year would be 4.42 pounds. There are five months that have higher tests than 3.84, enumerated according to the average, beginning with the highest: December has 4.12, November has 4.05, January, 4.02; October, 3.96, and February, 3.89. Seven of the months have tests lower than the average and are, beginning with the lowest, June, 3.65; July, 3.67; May, 3.69; April, 3.71; August, 3.79; September, 3.80; March, 3.81. A comparison of the footings of table No. XIV will show a gradual increase in the tests each month from June to December, and a gradual decrease from December to June.

The above tests are for butter fat. To these add 15 per cent for overrun, and the result in tabular form shows the average yield of butter for each month during the year.

TABLE No. XV.

MONTH.	BUTTER FAT—ADDING 15 PER CENT.	YIELD OF BUTTER.
June	3.65	4.20
July	3.67	4.22
August	3.79	4.36
September	3.80	4.37
October	3.96	4.59
November	4.05	4.66
December	4.12	4.74
January	4.02	4.62
February	3.89	4.47
March	3.81	4.38
April	3.71	4.27
May	3.69	4.24
Average for the year	3.84	4.42

From the above table we find that it required 23.8 pounds of milk to make a pound of butter in June, and 21.4 pounds in December, and the average for the year was 22.6 pounds of milk for each pound of butter. These figures are based upon the reports from 191 creameries as shown in table No. XIV. In table No. XI, 479 separator creameries report 1,006,964,031 pounds of milk received, and 44,324,297 pounds of butter made therefrom, which is 22.7 pounds of milk for each pound of butter. The results from these two different sources are nearly the same, and indicate that 15 per cent is about the correct amount to allow for the overrun.

The figures in table No. XIV show a remarkable uniformity in the quality of milk delivered to the factories in different counties of the state, and indicate there is no particular part of the state having a natural advantage over other portions in the production of milk as far as quality is concerned. Before the invention of the Babcock test it was impossible to obtain information of this kind. The importance and great advantages of the milk testing system for determining the value of milk is every day impressing itself upon those engaged in commercial dairying. While this is true, we are sorry to note the rapid increase in the number of complaints made to this office of its supposed abuse. The complaints are of two classes —first, those from the patrons of creameries claiming that their milk is not being correctly tested, or that proper credit is not given them. The second class are complaints made by creamery managers charging that some creameries jockey with their tests and attempt to gain favor with their patrons by dishonest and false representations. Granting that the party making the tests is honest, all just reasons for complaint are caused by carelessness in taking and preserving samples to be tested, or in manipulating the tests, by poor acid, worn out testing machines, or incorrect pipettes and bottles. The complaints originating from creameries are usually brought about by some manager who attempts to increase his patronage by pretending to get larger results than his neighbors, but in reality is not paying any more per hundred weight for milk of the same quality.

The Babcock test shows the number of pounds of butter fat in 100 pounds of milk of which the sample is a part. A sample of the milk delivered by each patron each day to the creamery is taken and placed in a glass jar containing a preservative and a sample of this composite is tested at the end of two or more weeks. At the time of each settling period these individual tests are averaged and the monthly yield of butter fat is determined. A large number of creameries settle with their patrons on the basis of the butter fat found in the composite sample. A factory has made so much butter during the month, and received a certain sum of money for the same, over and above the expense of making and selling it; this net amount is usually distributed among the patrons in proportion to the amount of butter fat in their milk as shown by the test of their composite sample. This is determined by multiplying the number of hundred pounds of milk delivered by the patron by the average amount of butter fat, as shown by each patron's composite test. It will be seen that if the butter fat, as shown by each composite test, is cut a certain per cent, the aggregate amount of butter fat to be settled for will be reduced, and as the amount to be distributed remains the same, the rate per pound of butter fat will be larger. The factories doing this kind of work seek to gain a reputation for making larger returns to their patrons than they really do. Other creamery managers have reversed this manner of deception by reporting a larger test of butter fat than the patron is entitled to, and at the same time decreasing the returns by the same per cent per pound on butter fat. In both these cases there is no loss to the patrons, as each gets his share of the returns for the month, but such practices are demoralizing to the creamery business in general. The honest, straightforward creamery operator is kept in hot water, as it were, all the time, and the seeds of discontent and discord are sown among the patrons of all neighboring creameries. Reports of these large yields, or large returns per hundred weight of milk, find their way into the columns of our county newspapers and dairy press and create suspicion of dishonesty and unfair dealing between patron and honest manager in many of the creameries scattered over the state. The patrons do not understand why their manager cannot return to them as high a yield of butter fat, or as much per pound, as these jockeying and advertising competitors do to their patrons.

As an illustration of this condition of affairs we reprint the following, which was published in a county paper printed in one of our largest dairy counties:

> At the ...... creamery for November, the average test was 3.65. Twenty-eight cents was paid for butter fat, and the yield was 5 pounds of butter for each 100 pounds of milk.

Accompanying a clipping of the above item, I received the following letter of explanation, which is to the point:

W. K. Boardman, State Dairy Commissioner, Des Moines, Iowa:

DEAR SIR—I enclose you a clipping from the ...., showing what .... creamery paid for November. Now, I would like to know if it is lawful for a creamery company to do business that way? It seems to me that their test is rather low for the yield. This kind of work is causing a great deal of trouble among the creameries in this section. I cannot see what good the Babcock test is, if the secretaries are allowed to cut the test down in this way just to pay more for butter fat. It makes trouble for a creamery giving an honest test. If there is no law to prohibit such test-cutting, I think there should be, and if there is, I should like to see it enforced at once. Yours respectfully,

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The difference between the butter fat in this case and the yield of butter per 100 pounds of milk, shows an overrun for the churn of 37 per cent, whereas the usual overrun is about 15 per cent. The dairy laws in regard to the testing of milk provides for correct testing and an honest use of the test as between patrons and factory, but the author of the law did not foresee the deception and dishonest manner in which the results of the tests could be used so as to make trouble between upright creamery operators and their patrons. All these difficulties point to the necessity of careful creamery inspection, which was so strongly advocated in my last report. However, if this advanced step can not soon be taken, the law should be so amended as to authorize the dairy commissioner, or some person chosen by him, to have the right to enter any creamery operated under the test system in this state, and that he should be authorized to test any composite samples found therein.

THE IOWA DAIRY COW.

The managers of creameries reporting to this department experience a great deal of difficulty in accurately determining the average number of cows per patron, and the figures given upon this subject in our tables are not entirely satisfactory. Many of the cows reported are heifers being in milk their first season and farrow cows not having calved for one or two years, so that the Iowa dairy cow does not make a creditable showing in the quantity of milk produced. Our tables show that there is an average of 919 cows to each creamery, and each creamery makes an average of 103,000 pounds of butter per year, or 112 pounds per cow. To this amount should be added the home consumption of butter and milk by the patron's family. The number of cows per patron is small, being but 7 in number, and the average size of the farmer's family, including help, is large, and as a rule, the housewife on the farm makes free use of butter and milk, so that an estimate of 150 pounds of butter per cow per year on the average is about correct for cows furnishing milk to our creameries. The quality of milk furnished to our creameries is good, as shown by the yearly average production of butter, which is 4.42 for each 100 pounds of milk. The yield of butter fat of the milk from our Iowa cow is very satisfactory, but the quantity, not over 3,500 pounds on the average per cow, for the milking period of—say 300 days, or about 11 pounds per day for each cow, is altogether too small. A large per cent of our cows must be short milkers, calving in the spring and becoming dry in the hot and dry months of the summer. It is in this direction that the dairyman must look for improvement and a decrease in the cost of production of dairy products. The dairyman of Iowa should not be satisfied until the standard of the Iowa cow has been raised to at least a yearly average of 5,000 pounds per cow. Since the low prices of dairy products have become established it is absolutely necessary for the farmer who would continue to make money in dairying, to study the individual members of his herd and weed out the unprofitable and improve the short milker. In order to present this matter to the dairy farmers of our state, and give them the ideas of one of our most careful students, advanced thinkers and investigators upon this branch of dairy farming, C. F. Curtiss, professor of agriculture at the Iowa Agricultural college, was requested to prepare an article upon the subject of the dairy cow. He complied with the request, and we take great pleasure in presenting it to the readers of this report, with the most hearty endorsement of this department.

THE DAIRY COW.

BY C. F. CURTISS.

The cow is necessarily the prime factor in the dairy problem. More advance has been made within the last decade in perfecting the work in the creamery than has been effected in the fundamental problem of improving the dairy herds. The creamery manager is generally in advance of the cow manager, yet no creamery can ever reach the full measure of success without a generous patronage of successful patrons. The patron's business is in need of some of the exact business management and the application of some of the scientific skill that has characterized the progress made in the creamery.

Every cow is a creature of her surroundings, and every breed of cows is just what the surroundings make it. The intelligent, practical and scientific way to study a breed then is to look into the environment and conditions surrounding the breed in its place of origin. It is well to begin by studying geography, climatology, soil and products, and following that, the treatment, care and handling of the dairy cow under native influences. We must study the agriculture of a country in all of its relations if we would fully understand its live stock. As a preliminary to the consideration of the several types and breeds, I can only call attention briefly to some of the factors that have entered into their formation.

The dairy cow, like all other domestic animals, attains the highest perfection in the hands of the most skillful breeders. The North American Indians, as a class, have a peculiar dislike for milk and all of its products. The inhabitants of China use but very little cow's milk even in the present day, while the Arabians rely principally on the mare for their supply. The Anglo Saxon population of the British Isles and the United States, however, consume the products of the dairy in large quantities. The United States now has about 17,000,000 dairy cows.

Originally, cattle were kept principally for the purpose of labor and for milk. The ancients had superstitious views about eating the flesh of the ox. It is hardly more than a century since there were no special beef breeds of cattle in England. All were developed for the dairy as well as for the block. The milk giving qualities of the original Shorthorn were unsurpassed by any breed of England. Even the beefy Hereford, until affected by the blood of the Tompkins fat cows in the latter part of the eighteenth century, was highly prized by the Herefordshire farmer as a dairy animal.

The principal dairy breeds have been developed in the Channel Islands, Germany, Holland and Switzerland. In studying these breeds in their native localities, this one significant fact is noticeable in every case—wherever you find a good dairy cow, you find her systematically bred, carefully and kindly handled, comfortably housed and well fed. Good cows do not come by chance, nor by haphazard methods. The husbandman of Jersey Island will neglect everything he has to take care of his cow. Nothing is too good for her.

The Channel Islands, of which the Jersey, Guernsey and Alderney cattle are native, are located in the English Channel, near the coast of France. They are known as Jersey, Guernsey, Alderney, Sark, Jethou and Herm. Geographically these islands belong to France, and in habits and characteristics the people are essentially Norman, notwithstanding the fact that they are loyal subjects of the British crown. These islands are intensely interesting, though but a mere dot on the globe's surface, the entire six being hardly half the size of the smallest county in the state of Iowa, and not more than two-thirds of that subject to cultivation. Their rugged outline and granite peaks rising sometimes 400 feet high and lashed by the beating waves and surgent tides until at times they appear to be almost submerged, present a landscape that at first appears almost barren and directly the opposite of a quiet, pastoral scene. The southern slope of these ranges, however, is intersected with numerous ravines and streams, the valleys of which are exceedingly fertile, and the climate is so mild and equable that tropical flowers bloom there the year round, and snow and frost are practically unknown. The wintry blasts and summer's suns are equally tempered, for the highest temperature rarely exceeds 80°. The average daily range of the thermometer in ten years is only about 8°. Rain falls about 150 days in the year, though the sun shines generously during the day.

Jersey Island has a population of about three persons per acre. Dairying, market gardening and fruit raising are almost the sole occupations of the inhabitants of the island. Close proximity to the great markets of London and Paris render these occupations highly profitable. As high as $300 is paid for the rent of a single acre of land in one season. The potato is the chief crop. It is not uncommon for the Jersey farmer to realize $1,000 per acre from this crop, then manure heavily with barnyard and commercial manures, or sea weed, and take a second crop the same season averaging two-thirds as much. A large part of all their fruit and vegetables is grown under glass. The farms average only seven acres each and many of them contain only one or two acres.

The Jersey herds likewise usually number not more than two to a half-dozen cows. The Jersey breeder grows for his herd a liberal supply of roots, clover and beans, and in addition cider and spices are fed to a limited extent as tonics. The cow is so well cared for and so judiciously fed that she gives the highest possible returns. The intensive system of agriculture prevails in the highest degree. For over half a century it was a crime to import a single animal of the cattle kind from any foreign country, and even yet the importation of cattle is prohibited except under the most rigid regulation. This explains why Jersey cattle are so much alike, so purely bred and so prepotent. The breeding of the celebrated Jersey bull Stoke Pogis III is said to trace forty times to the same ancestor.

In Holland, the home of the Holstein cow, we find essentially the same care bestowed upon the dairy stock. There the soil is lower lying and moister and the vegetation very rank. Much of the tillable land has been reclaimed from the ocean by the erection of dikes and the operation of large pumps and windmills to carry off the surplus water. The farms still lie several feet below the level of the sea. This is an exceedingly rich and productive area. Sometimes as high as three and four crops are taken off in a year. Ten acres of good land supports twenty large cows the year round, and sometimes more. In the seventeenth century, the historian Motley wrote concerning the Netherlands, "On that scrap of solid ground rescued by human energy from the ocean, were the most fertile pastures in the world. On these pastures grazed the most famous cattle in the world. The cows produced two and three calves and the sheep four and five lambs at a time. In a single village 4,000 kine were counted. Holland alone, at one time, supplied nearly the whole of continental Europe with butter and cheese."

Here, as in the home of the Jersey, the cow is the object of special attention, and the dairy herds are largely under the management of women. The unparalleled development of the Holstein cow is due to the careful, painstaking and industrious wife of the Hollander and German more than to any other influence. The vegetation grows ranker and more abundant in Holland than on the Channel Islands, and the cows are consequently larger. The feed is not so rich and is more watery, and the same is true of the milk. The cow is never exposed to inclement weather and the stables are kept, it is said, as clean as the dwelling, and both are under the same roof. The cows are even blanketed when turned out at certain seasons of the year, to protect them from the chilling winds from the sea.

Across on the opposite side of the North Sea, in the northeastern part of England, is a fertile valley that has become famous as the home of the Shorthorn breed of cattle. This is along the River Tees in Durhamshire. These cattle were first known as the old Teeswater cattle, and later the Durham, and finally both names were superseded by the term Shorthorn. That this is a fertile region, peopled by thrifty farmers and good feeders, is fully attested by the records of such specimens as the White heifer, the Durham ox, and great numbers of the early and modern representatives of the breed. These cattle are fed liberally and were originally developed for the dairy as well as for beef. They were for many years the leading dairy cattle of England, and while many of the modern Shorthorns have been bred exclusively for beef, the old dairy trait is yet a characteristic of the breed and capable of a good degree of development at any time by right methods.

The Red Polls are native of Norfolkshire, not far from Durham, and their surroundings and characteristics do not differ greatly from the Shorthorns, except that the dairy qualities are perhaps a little more uniform, and hardly as much excellence has been attained in beef.

Over across the border in the county of Ayrshire, in southwestern Scotland, we find the home of another breed, the Ayrshire. This locality has a thinner soil, a scantier vegetation, and a more rigorous climate. These factors have exerted an influence on the breed and we have in the Ayrshire the so-called poor man's cow, created primarily for the production of the cheese that has become so widely known throughout Great Britain. This cow is also adapted to furnishing the tenant farmer his milk, butter and meat.

The rugged little country of Switzerland is also the home of several dairy breeds, the principal ones being the Brown Swiss and the Simmenthal. These are large cattle and they are rich and heavy milkers. Here, as in Holland, the dairy herds are largely in the hands of the women, and the importance of comfort and protection is so fully realized that many of the best herds pass the entire winter in large stone barns into which frost never enters. The arrangements for lighting, ventilation and cleanliness are so complete as to afford the most perfect conditions.

These are briefly the conditions under which the principal dairy breeds have been developed. The lesson from the history of the dairy cow is that whatever developed to any degree of excellence she has been well fed and highly cared for, and it is useless for us to expect good results without a corresponding degree of good treatment.

The adaptation of these breeds to meet our requirements will depend primarily upon the conformity of our conditions to those that have given rise to these cattle, though all of the breeds are susceptible of more or less modification, and in a measure capable of adjustment to new conditions. We have a greater abundance of rich feed than any of the localities we have been considering, and all of these breeds may be and are improved by liberal feeding and generous treatment in the Mississippi valley states. As an instance it is generally known that the American Jersey is larger and hardier and a better producer than her foreign ancestors, and likewise the Holstein becomes a richer milker and consequently a better producer. Holstein milk averages nearly 1 per cent richer to-day than when this breed of cattle was first introduced. A patron of the college creamery at Ames has a herd of Holsteins that averages 4 per cent butter fat, and he tells me that several of them run up as high as 5 per cent. The Ayrshires in the hands of the best American breeders become better milkers and furnish better carcasses for the block, than when developed on their native heath in Scotland.

The selection of dairy breed involves, not alone the qualities and characteristics of the breeds, but in large measure the individual consideration of the dairyman or farmer, the locality and character of the farm, and the purpose to which it is to be put. These can only be determined individually by each man and upon each farm. For special dairy farming it is unquestionably advisable to select a special dairy breed and exclude everything else. If, however, feed and pasture are abundant and dairying without abandoning beef production is the object, then it is equally clear that a breed possessing both qualities must be selected. There is no longer any question about the advisability of this course. There may be localities where dairying, to be made profitable, must be done exclusively with special dairy breeds, but Iowa does not come in that class. For special dairying the Jersey, Holstein, and Guernseys are justly entitled to the prominent rank they occupy in the west; and for milk and beef combined, the Shorthorns and Red Polls are entitled to first consideration. One point I wish to impress here, and it is of vital importance, viz.: Profitable dairying and beef production combined cannot be accomplished with either an exclusive beef or dairy herd. Shorthorns and Red Polls used for this purpose must be selected for the dairy as well as for the block, and on the other hand, no man ever succeeds in producing beef from a dairy breed.

A mistake is often made in supposing that because a breed is large and capable of making a rapid gain, it possesses beef merit. This is a fatal error. The Holsteins, for instance, are a special dairy breed, and as such they take high rank, but they are entitled to no consideration whatever as a beef breed. I am aware that this is contrary to the claims of some of the friends of this breed, and I will concede that it is possible to make, at a given age, practically, if not fully, as great weight and as rapid gains in the feed lot from Holsteins as from the beef breeds, but no man can afford to make a business of producing beef from dairy Holsteins, in these days of close competition and narrow margins. I say a dairy Holstein because a dairy Holstein is the only kind worth keeping. It will cost fully as much, and generally more, to make a pound of beef from the dairy than from the beef breeds, and the work of the Iowa experiment station clearly demonstrates that when produced under the same conditions, the dairy beef is worth on the market from 15 to 25 per cent less—enough to more than wipe out all the profits. It would be easier to secure a profitable dairy herd in the beef breeds than to do a successful beef business with the dairy bred cattle, though it would be extreme folly to undertake either. The lesson, however, is that when beef-making and dairying are to be combined, only well selected herds from combined breeds can be used with profit.

And after all, while it is a good thing to study dairy breeds, it is even better to study dairy cows. Success with the cow is the fundamental problem in dairying. The dairy industry in a good many sections of the west has made about as much improvement as it can make under present conditions, until the cow and her management is improved. It is universally recognized that our butter-makers rank among the foremost of the world, but our dairy herds as a class, fall far behind. One of the first essentials is to be able to distinguish a good dairy cow from one that is not a dairy cow at all. It will be observed that there is a wider range of variation between the individual cows in any one breed than between the breeds themselves, so the selection of a breed is only the initial step in dairying. Generally there is a wider relative variation between the cows of a single dairy herd than between the several dairy breeds. I recently saw the record of an individual list of forty-one cows in a private herd in Denmark, that little competitor of ours over there that leads every nation of the globe in the skill attained in the dairy and the superiority of its products. In this herd the cost of producing a pound of butter from the poorest six cows was just double what it cost to produce a pound from the best six, about 17½ cents from the latter and about 35 cents from the former, and what is more, the expense of producing a pound of butter from the poorer cows was about 10 cents above the average price of butter on the Danish market. These results were translated from a Danish report by J. H. Monrad and published in the Breeders' Gazette. The chief difference between the foreign dairyman and the American is that the Dane takes steps to arrive at these bottom facts, and immediately puts his herd on a paying basis, while we are content to go groping in the dark and be satisfied with the average results. We are too often content with securing cows of some of the approved dairy types or breeds, and leaving the results to take care of themselves. It is well to study dairy characteristics and to have an ideal type, but it is a better thing to study facts. Find out what a cow is producing and what it costs to produce it, and make that the basis of selection. Discard the cow of any breed, type, or ancestry that falls short of the line of reasonable profit. Not all of the good cows are in any one breed, nor all of the cows of any breed good ones. I believe in developing breeds, but not in following breeds blindly.

Cows differ greatly in their capacity to assimilate feed and convert it into dairy products. In a recent test made at the Pennsylvania experiment station, it was found that a cow in their herd that produced 296 pounds of butter in a year, only gave a profit of $31, while another cow that produced only 279 pounds of butter gave a profit of $60 a year; so we need to look at even more than the product of a cow to have an exact knowledge of what she is doing.

When one of the best practical dairymen of the west first applied the Babcock test to his herd, he reports that he not only had unprofitable cows, but that it was taking all of the profits of another cow that produced 265 pounds of butter in a year to compensate for the loss of one of these that fell below. When two of these cows were kept together they just paid expenses, and returned neither profit nor loss. When the poorer one was sold, the other returned a profit of $13.65. This is the report of H. B. Gurler, of DeKalb, Ill. We have all heard about the man who makes two blades of grass grow where one grew before being a public benefactor. In this case, the man who makes two cows grow where one grows better alone is neither a public nor a private benefactor. It is a losing business.

Professor Haecker has admirably illustrated the difference in cost of producing a pound of butter from good cows and those that are not. He has shown that the cost in the Minnesota experiment station herd ranged from 10.8 cents to 18.2 cents. All of these figures go to show the necessity of close attention to the details in the management of a dairy herd. The author of a late humorous story has put it in this way. He says: "The old adage is put not all of your eggs in one basket, but I say unto you put all of your eggs in one basket, and then *watch that basket.*"

This is rapidly becoming an age of specialization and of intensive application; and whether we believe in special farming or not, there never was a time when the basket containing our invested capital required closer attention than now, and not only closer attention, but abler direction and more skillful management. That is where we are in dairying today and we need to "watch that basket." Dairying possesses many advantages entitling it to the consideration of the Iowa farmer, and it is a branch of agriculture that this state is eminently adapted to, but I would advise no man to go into it who is not prepared to do the work thoroughly and in the most intelligent manner.

I wish in closing to refer briefly to the subject of selection of dairy cows —selection within one breed and among all the breeds. I say briefly because this subject is of such importance as to merit an extended discussion.

I have learned that there is a very wide diversity of opinion about what constitutes a good cow. About a year ago I wished to revise the score card or standard of excellence that I was using in my class work on this subject, and I took occasion to submit an outline of my proposed standard to some of the leading dairy authorities, and invited their criticism and suggestions. There was far less uniformity of opinion than I had anticipated. In fact, I know of no question pertaining to animal husbandry that admits of so wide a range of judgment. This and other evidence furnishes conclusive proof to me of one fact, that is, that the prevailing ideas of what constitutes a good dairy cow are very much broader than they formerly were. This is as it should be. It is well to recognize a good cow, from any source, no matter what her color, form, character, size or breed. The tendency is to pay less attention to the points of fancy and theory and simply look for utility, and a good cow, leaving all speculation aside. The lessons of recent investigation have taught that there is no narrow, inflexible type of dairy cow, as has sometimes been claimed. The only way to be absolutely certain of the capacity of a dairy cow is to make careful use of the feed measure, the milk scales and the Babcock test. There are, however, certain varying but reasonably infallible indications of dairy merit. In other words there is a well-defined, broad, general, dairy type. This type should be familiar to the dairyman. It should be cultivated to the highest degree, and perpetuated in the herd.

The following is a copy of the score card, or standard of excellence, that my classes are now using in studying dairy cattle. Many of the characteristics are of minor importance and need only to be considered in a general way. I will here discuss only some of the more essential characteristics of a dairy cow, without going into details:

IOWA AGRICULTURAL COLLEGE—DEPARTMENT OF AGRICULTURE.

STUDENT'S SCORE CARD—DAIRY CATTLE.

SCALE OF POINTS.	Possible score.	POINTS DEFICIENT.	
		Student's estimate.	Revised.
(a) GENERAL APPEARANCE: 20.			
Weight—Estimated............ ...lbs.; actual.... ....lbs..	... ..	......	......
Form, wedge shaped as viewed from front, side and top.	7	......	......
Quality, hair fine, soft; skin mellow, loose, medium thickness, secretion yellow; bones clean......	9	......	......
Temperament, nervous, indicated by lean appearance......... ..	4	......	.....
Objections, thick fleshy form, coarse coat, or hard handling......	......	......	......
(b) HEAD AND NECK: 10.			
Muzzle, clean cut; mouth large; nostrils open....................	1	......	......
Eyes, full, mild, and bright..	3	.....	. ....
Forehead, broad, face lean......	2	......	......
Ears, medium size, yellow inside, fine texture.......................	1	......	......
Neck, fine, lean, thin, medium length; throat clean.............	2	......	......
Horns, small at base, fine texture......	1	......	......
Objections, masculine or meaty head, coarse horns or dull eyes..	......	......	......
(c) FOREQUARTERS: 5.			
Withers, lean, thin..	2	......	......
Shoulders, light, lean, oblique	2	......	......
Legs, straight, short; shank fine..........	1	......	......

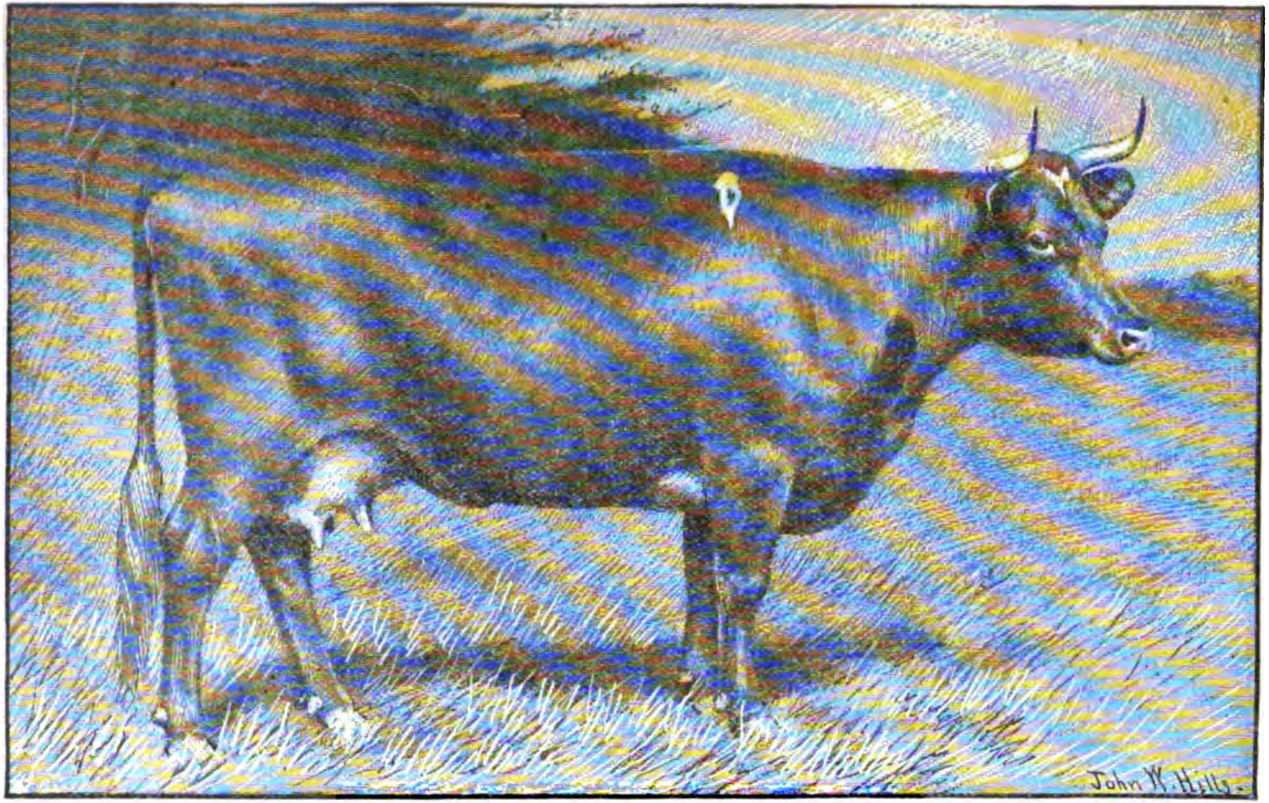
STUDENT'S SCORE CARD—*Continued.*

SCALE OF POINTS.	Possible score.	POINTS DEFICIENT.	
		Student's estimate.	Revised.
(*d*) **BODY:** 25.			
Chest, deep, low, wide	8		
Ribs, broad, long, wide apart; large barrel	6		
Back, lean, nearly straight, open jointed	4		
Loin, broad and strong	5		
Navel, large and firm	2		
Objections, narrow chest, close ribs, fleshy back or weak loin			
(*e*) **HINDQUARTERS:** 40.			
Hips, wide apart, strong	2		
Rump, long, wide, giving roomy pelvic arch	2		
Tail, long, slim, fine switch	1		
Thighs, thin, spare, long	5		
Escutcheon, spreading over thighs; high and wide	2		
Udder, long, flat under surface, attached high, full behind, quarters large and even, but not fleshy	15		
Teats, large, evenly placed and of good form	4		
Milk Veins, large, tortuous	4		
Milk Wells, large and open	2		
Legs, straight, far apart, shank fine	3		
Objections, narrow hips and rump, small escutcheon, deep or contracted udder, teats close together or uneven; milk veins and wells small, legs coarse or close together			
Total	100		

Animal.................................Owner...

Student...............................Date..

In the first place it will be noticed that a good cow always has the same general form, known as the wedge shape. This form is the result of milking capacity rather than milking capacity being the result of form. In other words, the cow that milks well must necessarily take on the wedge form, but not all cows of this form are good milkers. There are occasional and not very rare exceptions in which cows have sprung from good dairy ancestry and inherited dairy forms without inheriting dairy capacity; consequently form is not infallible evidence of dairy excellence. It is, however, an almost unvarying accompaniment of dairy excellence, regardless of breed. This is true by reason of the fact that the demands on the highest type of dairy cow are such that development of udder, depth and capacity of barrel, width of pelvis and loin, and spring of hind ribs are a necessity. These are the maternal and milk forming organs, and their development and expansion is essential to the highest development of the milking function of the cow. The operation of this principle is plainly apparent in the representatives of breeds that are of entirely distinct type, such as the Jersey, Holstein and Shorthorn, as shown by the accompanying illustrations. This depth, expansion, and capacity of the vital dairy organs, together with a good udder and milk veins, and a maximum digestive capacity, are the prime essentials of a good dairy cow. They indicate the two principal factors that are of greater significance in determining dairy merit than all others together; first, that the cow is capable of converting her feed into milk, and second, that she is capable of making good use of a large quantity of feed. These are the points upon which practical utility and


John W. Hills.

SHORTHORN COW. BELLE OF SQUAW CREEK, VOL. 36.
Milk record, 77-day test, 3.4 pounds per day. Milk test, 77-day period, 3.71 per cent. Butter record, 77-day test, 1.35 pounds per day,

HOLSTEIN COW. PRINCESS OF BLACK HAWK, No. 39385.
Milk record, 77-day test, 39.2 pounds per day. Milk test, 77-day period, 3.45 per cent. Butter record, 77-day test, 1.57 pounds per day.

John W. Hills.

JERSEY COW. NICOLETTE, No. 65992,
Milk record, 77-day test, 18 pounds per day. Milk test, 77-day period, 6.93 per cent. Butter record, 77-day test, 1.46 pounds per day.

profit turn. I have enumerated a number of other characteristics in the score card presented, all of which are deserving of more or less attention, but they are merely contributory to the same ultimate end, viz. that of the highest practical return for a generous ration. For instance, I regard a thin spare thigh, as of vital importance, but this is only a necessary accompaniment of a good udder, for it is impossible to have a good development of udder with a full, round meaty thigh. The one precludes the other. As a further indication I like to see a richly colored mellow skin, a clear, prominent eye, a thin neck, a clean head, lean shoulders, prominent spinal column, and strong nervous organization, together with good respiratory and circulatory organs and other minor marks of dairy capacity, but these are all subordinate to the tangible and practical evidence furnished in the first named qualifications.

The Shorthorn illustration represents a cow that combines beef and dairy qualities in a profitable degree. I prefer to use the term combination cow. General purpose is too vague and misleading. By combination I mean just two things — beef and milk. I do not claim that it is possible to obtain the highest degree of excellence of each in the same animal, but it is possible and prrcticable under given conditions to obtain a profitable degree of excellence in both. I want also to state that I regard it more difficult to breed and maintain a herd of this character than one of the special breeds. It will require closer study and attention, and a higher degree of skill. One reason for this is that comparatively few herds have been intelligently and systematically developed for the combination purpose, and the combination traits are not yet well established.

This cow was one of eight taken from the college herd for an experiment, the object of which was not to test the capacity of the cows but to test the relative value of different feeds, particularly roots. She was put into a seventy-seven day test, January 1, 1895, having been in milk since November 7th previous. During this seventy-seven day period, her average daily yield of milk was 31.4 pounds, containing 3.71 per cent of butter fat. This is equivalent to 1.16 pounds of butter fat, or 1.35 pounds of butter per day for seventy-seven days, under conditions, owing to the nature of the experiment, that were not altogether favorable. In this test there were two Shorthorns, two Jerseys, and four Holsteins. The Jerseys made butter at a cost of 10 4 cents per pound for feed consumed; the Shorthorns at 12.7 cents, and the Holsteins at 12.9 cents. All feeds were charged at the high prices prevailing in 1895. During this test, however, the Shorthorns gained forty-five pounds each, and the Holsteins forty-one pounds each, while the Jerseys just held their own. All were fed the same kind of a ration. The Holsteins were a little farther advanced in their period of lactation than either of the other breeds. A more nitrogenous and succulent ration for the Holsteins and Shorthorns would doubtless have made more milk and less gain. More care is necessary in feeding a combination animal for milk than one of a special purpose, as the former has more of an inherited tendency toward flesh, and when milk is wanted it is necessary to feed for milk. One reason why many cows of the combination type never milk profitably is that they are never fed properly for milk. The Holsteins averaged 1.25 pounds of butter per day, and the Jerseys and Shorthorns 1.26 pounds per day. The yield was practically the same in all cases; the difference in cost was due to the varying amounts of feed consumed.

The Shorthorn cow here illustrated is a good average representative of the combination cow. She is capable of taking on flesh readily when dry, and her male calves, when finished for the block, are capable of topping the market. She has the dairy form to a fair degree, though she is not deep enough from loin to udder to indicate the highest dairy capacity. Other cows in the college herd excel her in this respect. This illustration, however, was made from a photograph taken when the cow had been in milk seven months, and when the udder was only about half filled. While she is broad at the loin and hind quarter she is thin and sharp at the crops and top of shoulder, and has a lean neck and spare flat thighs, giving room for udder development and elaboration of milk. Her head and eye indicate good vigor and character, and her chest capacity and vital organs are good. She presents rather too much flesh to be in the best dairy form but was photographed, as stated, when well along in her period of lactation. When a cow of this breed though, for that matter, of any breed, presents that thick, blocky, well-rounded form, full and deep at the thighs and flanks and broad and meaty over the crops, shoulder and neck, it will be useless to look for milk in that animal. These are the characteristics of the capacity for beef-making to the exclusion of all others. All breeds and all herds require careful selection.

The Jersey cow illustrated here is a good representative of the special dairy type. Her average yield of milk in the test referred to was eighteen pounds per day, and the test during this time showed an average of 6.93 per cent of fat. The conformation and udder development of this cow do not indicate a large yield, but the richness of her milk is quite remarkable. She produced butter more economically than any other cow in the herd, though it will be seen that her daily average was hardly as large as that of the Holstein cow illustrated here. This difference was doubtless mainly due to the better digestive and assimilative powers of the Jersey, and to some extent, perhaps, to the fact that the Jersey required less feed for maintenance than the Holstein. The latter principle furnishes basis for the claim sometimes advanced, that among cows of the same type, the smaller animals are always the more economical producers. This claim, however, is not fully sustained by facts. Economical production depends on other facts quite as much, or even more, than on size. A case in evidence is furnished by the records of the Columbian dairy test in which we find that the best five cows in the Jersey herd of 25 averaged 983 pounds in weight when they came out of the 15-day cheese test, while the poorest five cows, from the standpoint of economical production, in the same herd averaged, when they came out of this test only 884 pounds, or 99 pounds less; and in the 90-day butter test the best five cows in the Jersey herd averaged 1,038, while the poorest five cows averaged only 921, or 117 pounds less. Thus it will be seen that the records of this important test furnished a notable exception to the claim that small cows are necessarily the most economical producers.

The Holstein cow illustrated is also a good representative of her type. Her depth and capacity of barrel and development of udder and milk veins, indicate a strong flow and good yield of milk. Her record for the 77 days was 39 2 pounds of milk daily, containing an average of 3.45 per cent of fat. This record is equivalent to 1.57 pounds of butter per day. All of these cows had been in milk from one to three months at the beginning of the experiment, January 1st, and the test was made during the winter months. Had they been tested when fresh and on green feed the records would doubtless have been considered higher. The Jersey cow had been one month in milk at the time of entering the experiment, the Shorthorn two months, and the Holstein three months. These cows very creditably represent the respective types and breeds to which they belong. The Holstein and Jersey belong to the special purpose class, while the Shorthorn represents the combination or double purpose class.

BUTTER SHIPMENTS.

INFORMATION FROM THE RAILWAYS.

I take great pleasure in once more expressing for this department, and for the dairy people of Iowa, our appreciation of the help and valuable assistance rendered the dairy interests by the railways of Iowa. Most of the various lines in the state are alive to the value of the development of the great dairy industry in every suitable territory, and all the railways operating through the best creamery sections of the state, find it advantageous for them to keep special representatives looking after the demands and requirements of this class of products.

Many of the railways that in the past did not pay much attention to this traffic, now have special agents at work encouraging the erection of factories and establishment of creameries along their respective routes. These representatives of the railways and eastern fast freight lines are men of push and ability, and are generally well-posted on the subject of dairying. They do a great deal of good as they go from creamery to creamery, and keep the busy managers and buttermakers posted as to what is going on in the larger fields in this line of work.

They are a help in the various associations organized to protect and advance the dairy industry. They faithfully represent and look after one of the most important branches of the industry, namely—the transportation of our dairy products to the markets. This is done with noteworthy rapidity, and is watched with greater care than any other step in the entire process of supplying the people with fine butter.

This year the railways reported to this department upon the amount of butter billed to points outside of the state, cheerfully and promptly, and from these reports a table has been compiled showing the gross pounds of butter shipped from each county during the year ending September 30, 1896, as compared with the shipments of the previous year, and showing also the increase or decrease by counties.

TABLE No. XVI.

Iowa railway shipments compiled by counties.

COUNTIES.	NUMBER OF CREAMERIES FOR YEARS 1895 AND 1896 SHOWING INCREASE OR DECREASE BY COUNTIES.				GROSS POUNDS OF BUTTER SHIPPED OUT OF THE STATE FOR THE YEARS ENDING SEPTEMBER 30, 1895 AND 1896, SHOWING INCREASE OR DECREASE BY COUNTIES.			
	1895.	1896.	Increase.	Decrease.	1895.	1896.	Increase.	Decrease.
The State	774	810	89	53	79,141,775	95,277,281	17,793,559	1,658,053
Adair	5	6	1	......	239,949	406.075	166,126	....
Adams	8	5	......	3	286,891	477,317	190,426	....
Allamakee	14	13	....	1	1,225,415	1,281,925	56,510	....
Appanoose	......	......	......	......	85	38	....	47
Audubon	6	5	......	1	337,491	666.125	328,634	....
Benton	10	11	1	......	610,871	560,225	....	50,646
Black Hawk	22	22	......	......	2,034,634	2,524,553	489,919	....
Boone	5	4	......	1	183,139	247,610	64,471	....
Bremer	28	25	......	3	2.127,341	3,379,179	1,251,838	....
Buchanan	16	17	1	......	2,892,033	3,883,216	991,183	....
Buena Vista	6	9	3	......	842,627	1,162.147	319,520	....
Butler	17	18	1	......	2,259,776	2,988,122	728,346	....
Calhoun	6	7	1	......	820,319	1,033,209	212,890	....
Carroll	9	8	......	1	593,018	989,853	396,835	....
Cass	1	5	4	......	320,143	253,416	....	66,727
Cedar	10	6	......	4	957,690	1,116,959	159,269	....
Cerro Gordo	12	10	......	2	1,083.342	1,266.931	183,589	....
Cherokee	4	6	2	......	372,093	461,534	89,441	....
Chickasaw	19	19	......	......	3,125,343	3,071,315	....	54 028
Clarke	1	4	3	......	108,451	99,856	....	8,595
Clay	6	6	......	......	799,995	1,081,978	281,983	....
Clayton	22	20	......	2	3,311,315	3,296,653	....	14,662
Clinton	10	15	5	......	750,524	715,637	....	34,887
Crawford	6	6	......	......	344,544	284,829	....	59,715
Dallas	9	6	......	3	991,956	1,161,495	169,539	....
Davis	4	3	......	1	99,340	175,105	75,765	....
Decatur	2	......	......	2	7.011	14,919	7,908	....
Delaware	26	27	1	......	2,968,041	3,501,992	533,951	....
Des Moines	1	......	......	1	169,134	82,098	....	87,036
Dickinson	2	2	......	......	139,685	339,755	200,070	....
Dubuque	27	26	......	1	2,996,635	3,213,973	217,338	....
Emmet	5	5	......	......	323,930	402,300	78,370	....
Fayette	23	24	1	......	2,390,695	3,545,578	1,154,883	....
Floyd	7	8	1	......	809,680	915,385	105,705	....
Franklin	8	9	1	......	686,783	719,271	32,488	....
Fremont	......	......	......	......	46,766	1,076	....	45,690
Greene	6	6	......	......	1,164,378	1,357,264	192,886	....
Grundy	17	16	.....	1	1,150.950	1,407,680	256,730	....
Guthrie	2	6	4	......	183,301	378,112	194,811	....
Hamilton	8	6	......	2	1,725,037	2,048,991	323,954	....
Hancock	7	12	5	.....	814,358	825,428	11,070	....
Hardin	9	9	......	......	1,275,030	1,670,994	395,964	....
Harrison	......	2	2	.....	7,540	33.410	25,870	....
Henry	3	2	......	1	83.311	72,747	....	10,564
Howard	7	6	......	1	1,725,253	1,741,111	15,858	....
Humboldt	7	7	......	......	747,426	991,451	244.025	....
Ida	3	5	2	......	139,119	231,760	92,641	....
Iowa	6	5	......	1	421,770	630 642	208,872	....
Jackson	13	17	4	......	1,145,238	1,021,326	....	123,912
Jasper	10	10	......	......	404,840	673,190	268,350	....
Jefferson	4	7	3	......	339,597	381,562	41,965	....
Johnson	7	6	......	1	265,120	246,980	....	18,140
Jones	21	29	8	......	2,954,765	3,102,590	147,825	....
Keokuk	6	5	......	1	509,785	484,109	....	25,676
Kossuth	17	19	2	......	1,652,231	2,176,268	524,037	....

TABLE No. XVI—CONTINUED.

COUNTIES.	NUMBER OF CREAMERIES FOR YEARS 1895 AND 1896 SHOWING INCREASE OR DECREASE BY COUNTIES.				GROSS POUNDS OF BUTTER SHIPPED OUT OF THE STATE FOR THE YEARS ENDING SEPTEMBER 30, 1895 AND 1896, SHOWING INCREASE OR DECREASE BY COUNTIES.			
	1895.	1896.	Incaease.	Decrease.	1895.	1896.	Increase.	Decrease.
Lee	1	2	1		713,602	1.036,100	322,498	
Linn	29	28		1	2,358,397	2,472,643	119,246	
Louisa	3	3			129,345	83,970		45,375
Lucas	1	2	1		74,880	126,775	51,895	
Lyon	2	3	1		276,239	257,320		18,919
Madison	4	5	1		71,170	198,995	127,825	
Mahaska	2	2			306,638	226,900		79,738
Marion	6	4		2	272,485	296,384	23,899	
Marshall	7	8	1		728,744	990,217	261,473	
Mills	2	3	1		77,168	147,795	70,627	
Mitchell	10	10			1,758,425	1,795,350	36,925	
Monona	1	1			21,491	28,880	7,389	
Monroe					625	4,175	3,550	
Montgomery	2	2			338,470	244,133		94,337
Muscatine	6	6			474,100	475,215	1,115	
O'Brien	5	2		3	673,727	672,100		1,627
Osceola	2	2			64.810	57,015		7,795
Page	3	3			201,057	204.849	3,792	
Palo Alto	16	17	1		1,072,195	2,159,118	1,086,923	
Plymouth	4	7	3		429,500	835,475	405,975	
Pocahontas	4	5	1		391,908	896,209	504,301	
Polk	7	6		1	290,050	220,515		69,535
Pottawattamie	4	5	1		256,242	673,603	417,361	
Poweshiek	7	6		1	515,860	399.566		146,294
Ringgold	2	3	1		143,920	101,359		42,561
Sac	14	14			1,275,443	1,424,833	149,390	
Scott	5	3		2	90,628	128,273	37,645	
Shelby	4	4			54,427	204,808	150 381	
Sioux	7	9	2		620,065	914 991	294,926	
Story	15	14		1	1,624,007	1,257,115		366,892
Tama	7	6		1	613,680	609,285		4,395
Taylor	8	6		2	127,178	100,428		26,750
Union	4	10	6		447,890	982,463	534,573	
Van Buren	1	2	1		66,189	35,785		30,404
Wapello	4	5	1		1,437,555	1,404,098		33,457
Warren	1	3	2		5,760	55.840	50,080	
Washington	8	7		1	691,394	677,180		14,214
Wayne	5	6	1		554,280	767,494	213,214	
Webster	10	7		3	798.066	908,004	109,938	
Winnebago	9	14	5		1,112,610	1,070,980		41,630
Winneshiek	19	21	2		1,772.541	2,032,786	260,245	
Woodbury					969,896	1,864,851	894,955	
Worth	8	8			863,079	1,084,642	221,563	
Wright	5	4		1	885,305	851,500		33,805
Total	774	810	89	53	79,141,775	95,277.281	17.798,559	1,658,053

The table shows in detail the number of creameries and skim stations to be 810, an increase over 1895 of 86. Forty-one counties had an increase of 89, and 33 counties a decrease of 53 creameries. The total gross pounds billed out of the state was 95,277,281. Deduct 16 per cent for weight of the package, and the net pounds is 80,032,916. Last year the net shipments amounted to 66,479,108 pounds. These figures give 1896 an increase of 13,553,808 net pounds, over that of last year, which is equal to about 20 per cent. In 68 counties there was an increase of 14,946,582 net pounds, and in 31 counties there was a decrease of 1,392,794 net pounds.

In the report of last year comparisons were made of the counties shipping 1,000,000 or more gross pounds of butter. Below is given a complete table of all the counties with net shipments. The first column gives the number of net pounds shipped from each county, the second the rank of each county upon this basis, the third column gives the number of square miles in each county, following which is the number of net pounds per square mile shipped from each county, and the last gives the rank of each county upon the basis of shipments per square mile.

TABLE XVII.

COMPILED BY COUNTIES.

Showing total net shipments of butter from each county, and rank; area in each county; pounds per square mile for each county and rank. Also total shipment for the state with net pounds per square mile, for the year ending September 30, 1896.

COUNTIES.	Total net shipments of butter for year.	Rank by total lbs. shipped.	Area of square miles in county.	Pounds per square mile.	Rank by lbs. per square mile.
The State	80,032,916	......	56,025	1,428*	......
Adair	341,103	61	776	592	63
Adams	400,946	58	432	928	50
Allamakee	1,076,817	24	658	1,637	33
Appanoose	32	99	516	....	99
Audubon	559,545	54	443	1,263	48
Benton	470,589	58	720	654	62
Black Hawk	2,120 625	10	576	3,680	10
Boone	207,992	72	576	361	78
Bremer	2,838,510	4	432	6,570	1
Buchanan	3,261,910	1	576	5,663	2
Buena Vista	976.226	27	576	1.695	31
Butler	2,510,022	9	576	4,356	7
Calhoun	867,896	34	576	1,509	36
Carroll	831,476	38	576	1,443	38
Cass	212,869	71	576	369	71
Cedar	937,910	29	576	1,628	34
Cerro Gordo	1,064,221	25	576	1,848	27
Cherokee	387,689	60	576	673	61
Chickasaw	2,579,904	8	504	5,118	3
Clarke	83,879	87	432	194	85
Clay	908,862	31	576	1,578	35
Clayton	2,769,189	5	728	3,804	9
Clinton	601,135	49	698	861	53
Crawford	239,256	69	720	332	75
Dallas	975,656	28	588	1,659	32

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* Plus.

TABLE No. XVII—CONTINUED.

COUNTIES.	Total net shipments of butter for year.	Rank by total lbs. shipped.	Area of square miles in county.	Pounds per square mile.	Rank by lbs. per square mile.
Davis	147.088	81	502	292	79
Decatur	12,599	96	534	24	96
Delaware	2,941,673	3	576	5,107	4
Des Moines	68,962	89	415	166	87
Dickinson	285,394	66	404	706	60
Dubuque	2,699.737	6	601	4.492	6
Emmet	337,932	62	404	836	54
Fayette	2,978,285	2	720	4,137	8
Floyd	768,923	40	504	1,525	37
Franklin	604,188	48	576	1,049	46
Fremont	904	89	509	2	98
Greene	1 140,102	21	576	1.979	23
Grundy	1,407,680	19	504	2,346	19
Guthrie	317,614	65	593	536	66
Hamilton	1,721,152	14	576	2,987	14
Hancock	273.359	67	576	475	67
Hardin	1,403,635	20	576	2,437	18
Harrison	28,064	94	695	40	95
Henry	61.107	90	433	141	90
Howard	1,462,533	18	476	3,073	13
Humboldt	832.789	36	432	1,928	24
Ida	194,678	75	433	450	69
Iowa	530,642	47	584	907	52
Jackson	857,914	35	638	1,345	40
Jasper	565,479	51	730	775	56
Jefferson	330.508	64	433	742	57
Johnson	207,463	73	618	336	74
Jones	2,606,175	7	576	4,524	5
Keokuk	406,652	57	576	707	59
Kossuth	1,828,065	12	977	1,871	26
Lee	870,324	33	512	1,700	30
Linn	2,077,020	11	720	2,885	15
Louisa	70,536	88	407	173	86
Lucas	106,491	84	432	247	83
Lyon	216,149	70	587	368	72
Madison	167,156	80	576	290	81
Mahaska	190,596	76	576	331	76
Marion	248,763	68	576	432	70
Marshall	831.782	37	576	1,444	39
Mills	124,147	82	444	279	82
Mitchell	1,508,094	17	478	3,188	11
Monona	24,259	95	556	44	94
Monroe	3,507	97	432	8	97
Montgomery	205,072	74	432	474	68
Muscatine	399,181	59	437	913	51
O'Brien	564,564	53	576	980	49
Osceola	57,015	91	400	119	91
Page	172,073	79	557	309	78
Palo Alto	1,813.659	13	576	3,149	12
Plymouth	701,799	45	860	816	55
Pocahontas	752,816	43	576	1,307	41
Polk	185,233	77	585	317	77
Pottawattamie	565,827	52	960	590	64
Poweshiek	335.845	63	582	577	65
Ringgold	85,142	85	542	157	88
Sac	1,196,859	21	576	2,078	22
Scott	107.749	83	455	237	84
Shelby	172,039	78	590	291	80
Sioux	768.592	41	769	999	48
Story	1,055,977	26	576	1,833	28

TABLE No. XVII—CONTINUED.

COUNTIES.	Total net shipments of butter for year.	Rank by total lbs. shipped.	Area of square miles in county.	Pounds per square mile.	Rank by lbs. per square mile.
Tama	511,799	55	720	711	58
Taylor	84 360	86	548	154	89
Union	825,269	39	432	1,910	25
Van Buren	30,059	93	484	62	98
Wapello	1,179,442	22	432	2,730	16
Warren	46,906	92	569	82	92
Washington	568,831	50	566	1,005	47
Wayne	644,695	46	523	1,233	44
Webster	762,723	42	720	1,059	45
Winnebago	899,623	32	403	2,232	21
Winneshiek	1,707,540	15	694	2,460	17
Woodbury	1,566,475	16	573	1,794	29
Worth	911,099	30	402	2,266	20
Wright	715,260	44	576	1,242	43
Total	80,082,916	......	56,025	1,428	......

From this table it may be seen that there was an average shipment of 798,312 pounds per county, and 1,428 pounds for each square mile of territory in the state. Buchanan county ranks first in the amount shipped, and second in shipments per square mile; Fayette ranks second in amount shipped, but eighth in pounds per square mile; Delaware ranks third in amount, and fourth in shipments per square mile; Bremer ranks fourth in amount, but first in the shipments per square mile. The counties shipping more than 3,000 pounds per square mile are as follows:

	COUNTY.	LBS. PER SQ. MILE.
1.	Bremer	6,570
2.	Buchanan	5,663
3.	Chickasaw	5,118
4.	Delaware	5,107
5.	Jones	4,524
6.	Dubuque	4,492
7.	Butler	4,356
8.	Fayette	4,137
9.	Clayton	3,804
10.	Black Hawk	3,680
11.	Mitchell	3,188
12.	Palo Alto	3,149
13.	Howard	3,073

CREAMERY LIST.

List of creameries in the state, alphabetically arranged according to counties and towns, near where creamery is located, together with information pertaining to each.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by an individual, co-operative or stock comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Adair County.									
1	Adair..........	Adair Creamery	Ind...	Rowell & Beck......	Adair	Adair..........	J. P. Beck.......	Sep'tr..	Test..	645
2	Bridgewater...	Blue Grass Creamery ..	Ind...	A. L. Stewart & Co..	Fontanelle....	Bridgewater...	Albert Heyn....	Sep'tr..	Hd.	
3	Fontanelle	Blue Grass Creamery ..	Ind...	A. L. Stewart & Co..	Fontanelle	Fontanelle.....	W. F. Stewart...	Sep'tr..	Hd.	
4	Greenfield......	Greenfield Creamery...	Ind...	J. W. Darby	Greenfield......	Greenfield......	J. C. Sanders....	Sep'tr..	Hd....	888
5	Hebron...... ..	Hebron Creamery.......	Ind...	E. M. Lames.........	Stuart.........	Stuart..........	L. R. Winn.....	Sep'tr..	Test..	646
6	Orient..........	Elgin Creamery Co......	Ind...	O. Sands	Chicago, Ill....	Orient..........	H. W. Cowperthwaite.	Sep'tr..	Test.	
	Adams County.									
7	Corning........	Elgin Creamery Co......	Ind...	O. Sands, Pres.......	Chicago, Ill....	Corning........	Chas. Johnson..	Sep'tr..	Test..	198
8	*Carbon*.........	*Elgin Creamery Co.*	*Ind....*	*O. Sands, Pres.*.......	*Chicago, Ill*.....	....	....	*Sep'tr...*	*Test.*	
9	*Carl*......	*Elgin Creamery Co*.......	*Ind....*	*O. Sands, Pres*........	*Chicago, Ill*.....	....	....	*Sep'tr...*	*Test...*	177
10	*Mercer*..........	*Elgin Creamery Co*.......	*Ind....*	*O. Sands, Pres*........	*Chicago, Ill*.....	....	....	*Sep'tr...*	*Test.*	
11	*Nodaway*.......	*Elgin Creamery Co*.......	*Ind....*	*O. Sands, Pres*........	*Chicago, Ill*.....	....	....	*Sep'tr...*	*Test.*	
	Allamakee County.									
12	Dorchester ...	Ice Cave Creamery Co..	Stk Co	Ice Cave Cr'my Co..	Decorah........	New Albin.....	H. J. Foss	G. C.		
13	Lansing........	Ice Cave Creamery Co.	Stk Co	Ice Cave Cr'my Co..	Decorah........	Lansing........	Jackson Smith..	G. C.		

Skim-milk stations designated by *Italics*. *Manufacture both butter and cheese.

CREAMERY LIST—CONTINUED

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by an individual, co-operative or stock comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Allamakee County.									
14	Lansing	Calhoun Creamery Co.	Co-op	A. J. McCafferty, Sec	Lansing	Lansing	Geo. Turner	G. C.		
15	Lansing	Calhoun Creamery Co.	Co-op.	A. J. McCafferty, Sec	Lansing	Lansing		G. C.		
16	New Albin	Ice Cave Creamery Co.	Stk Co	Ice Cave Cr'my Co.	Decorah	New Albin	E S. Rice	G. C.		
17	Postville	Ice Cave Creamery Co.	Stk Co	Ice Cave Cr'my Co.	Decorah	Postville	Tom Hyde	S.& G C.		
18	Postville	Postville Farm'rs Co-op	Co-op	O. Ellison, Sec	Postville	Postville	J. A. Gordon	Sep'tr	Test	70
19	Quandahl	Arctic Spring Creamery	Ind	J. D. Johnson	Quandahl	Spring Grove	John H. Gaare.	G. C.		
20	Rossville	Rossville Co-op Crm'y	Co-op.					Sep'tr.		
21	Village Creek	Ice Cave Creamery Co	Stk Co	Ice Cave Cr'my Co	Decorah	Lansing	K Munson	G. C.		
22	Waterville	F'rs Co-op Cr & Com.Co	Co-op.	A. Asleson, Sec	Waterville	Waterville	A. Asleson	G. C.		
23	Waukon	Ludlow Co-op. Cr'y Co.	Co-op.	A. G. Winter, Sec.	Waukon	Waukon	F. Flet	Sep'tr	Test.	
24	Waukon	Oak Leaf Creamery	Stk Co	G. L. Hubbell	Waukon	Waukon	K. V. Ferris	G. C.		175
	Audubon County.									
25	Audubon	Sharon Creamery	Co-op.	B. Jenson, Sec	Audubon	Audubon.	B Jenson	Sep'tr	Test.	
26	Kimballton	Danish Sep'r Cr'y Co	Co-op	O. Christian, Sec	Kimballton	Audubon	Julius Anderson	Sep'tr	Test.	
27	Brayton	Oakfield Sep'r Cr'y Co.	Co-op	Jesse Nymand	Brayton	Brayton	A. S. Stone	Sep'tr	Test.	
28	Exira	W. Hamlin Sep Cr. Co.	Co-op.	H. P. Peterson	Exira	Exira	H. P. Peterson	Sep'tr	Test.	
29	Exira	Exira Creamery	Ind	F. F. Wilcox	Exira	Exira	F. F. Wilcox	Sep'tr	Test.	
	Benton County.									
30	Belle Plaine	Wintergreen Creamery	Ind	Boody, A. W & W. J.	Belle Plaine	Belle Plaine		Sep'tr	Hd.	

31	Blairstown	Katie's Creamery	Ind	Katie A. Duncalf	Blairstown	Blairstown	KatieA.Duncalf	Sep'tr	Test.	
32	Cedar Rapids	Fremont Creamery Co.	Stk Co	F. A. Lucas, Sec	Cedar Rapids.	Atkins	O. P. Lake.	Sep'tr	Test	286
33	Garrison	Star Creamery Ass'n	Co-op.	Geo. H. Speck, Sec.	Garrison	Garrison	F. M. Huyck	Sep'tr	Test	7
34	Shellsburg	Shellsburg Creamery	Ind	W. R McGregor, Sec.	Shellsburg	Shellsburg	W. R McGregor.	Sep'tr	Hd	95
35	*Shellsburg*	*Louieville*	*Ind*	*W. R. McGregor, Sec*	*Shellsburg*			*Sep'tr*	*Hd.*	
36	Urbana	Farmers' Co-op. Cr Co.	Co-op.	A. B. Cramer, Sec	Urbana	Center Point	C. M. Fisher	Sep'tr	Test.	56
37	Van Horne	Van Horne	Ind	Gardiner&McKenna	Van Horne	Van Horne	Geo. Gardiner	S.& G.C.	Test	998
38	Vinton	Vinton Creamery	Ind	Rowe Bros	Vinton	Vinton	Homer Barber	G. C.		
39	Walford	Walford Creamery	Co-op.	Novak & Jiler	Walford	Walford	W. H. Lewis	Sep'tr	Test	755
	Johnson County.									
40	*Danforth*	*Danforth*	*Co-op.*	*Novak & Jilek*	*Walford*			*Sep'tr*	*Test.*	
	Black Hawk County.									
41	Boles	Mt. Vernon Cr'y Co.	Co-op.	J E. Rundles, Sec	Boles	Janesville	Wm. True	Sep'tr	Test	151
42	Cedar Falls	Cedar Falls Co-op. Cr. As	Co-op.	L. H. Sevsin, Sec	Cedar Falls	Cedar Falls	A. W. Pierce	Sep'tr	Test	660
43	Cedar Falls	Benson Dairy Co	Co-op.	H. R. Brown	Benson	Benson	Geo. W. Thayer.	Sep'tr	Test	650
44	Cedar Falls	Black Hawk Cr'y Co.	Co-op.	J. C. Filkins, Sec	Cedar Falls	Cedar Falls	John Smith	Sep'tr	Test	669
45	DeWar	Pleas. Val. Dairy Ass'n	Co-op.	W. F. Garrett, Sec	DeWar	DeWar	W. H. Graham	Sep'tr	Test	82
46	Dunkerton	Lester	Ind			Dunkerton.	G. W. Meyerhoff.	Sep'tr	Test	271
47	Dunkerton	Farmers' Cr'y Ass'n	Co-op.	G. S. Kleckner, Sec.	Dunkerton	Dunkerton	O. G. Alexander.	Sep'tr	Test	1,002
48	Eagle Center	Eagle Center Dairy As.	Co-op.	T. J. Humphrey, Sec	Eagle Center	Waterloo	Jos. Hill	Sep'tr	Hd	328
49	Finchford	Union Creamery Co.	Co-op.	J. P. Churchill, Sec.	Finchford	Winslow	A. K. Smith	Sep'tr	Test	1,001
50	Fredsville	Fredsville Creamery	Co-op.	J. J. Thuson, Sec	Fredsville	Cedar Falls		Sep'tr		
51	Gilbertville	Gilbertville Dairy As.	Co-op.	E. Marion	Gilbertville	Washburn	I. I. Chase	Sep'tr	Test	638
52	Hudson	Rock Cr'k Fr's D'y Ass'n	Co-op.	W. P. Thompson	Hudson	Hudson	Thomas Hanson	Sep'tr	Hd.	
53	Hudson	Hudson Co-op. D'y Ass'n	Co-op.	D. Bedford, Sec	Hudson	Hudson	B. C. Knudson	Sep'tr	Test	670
54	Jubilee	Co-op. Cr. Co. of Jubilee	Co-op.	H. G. Koob, Sec	Jubilee	Jesup	H. B. Kanouse	Sep'tr	Test	325

CREAMERY LIST—CONTINUED.

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	Black Hawk County.									
55	La Porte City	La Porte Co-op. Cr'y Co.	Co-op.	Wesley Fegles, Sec.	La Porte City	La Porte City	Oscar Harvey	Sep'tr	Test	343
56	Louise	Louise Co-op. Cr'y Co.	Co-op.	John J. Large, Sec.	La Porte City	La Porte City	N. W. Johnson	Sep'tr	Test	277
57	Reinbeck	Red Bird Creamery Co.	Stk Co	Albert Vittum, Sec.	Reinbeck	Reinbeck	E. S. Stevens	Sep'tr	Test	680
58	Waterloo	Crain Creek	Ind	F. A. Riedell	Crain Creek	Waterloo	F. A. Riedell	Sep'tr	Hd.	131
59	Waterloo	Edwards	Ind	Wm. Widdel	Edwards	Waterloo	S. P. Doty	Sep'tr	Test	280
60	Waterloo	Farmers's Dairy Ass'n.	Co-op.			Waterloo	Samuel Swietzer	Sep'tr	Test	732
61	*Waterloo	North Star	Stk Co	Fowler Co.	Waterloo	Waterloo	Chas. Wood	Sep'tr	Test.	
62	*Waterloo	Waterloo Creamery	Stk Co	Fowler Co.	Waterloo	Waterloo	F. Wightman	Sep'tr	Test.	
	Boone County									
63	Madrid	Madrid	Ind	N. Laborde	Madrid	Madrid	N. Laborde	Sep'tr	Test	111
64	Ogden	Ogden Creamery	Ind	J. P. Cumming	Ogden	Ogden	F. E. Lewis	G. C.		
65	Remner	Remner's	Ind	Remner Bros	Grand Juncti'n			Sep'tr	Test.	
66	Story City, [Story Co.	Rosendale Co-op.	Co-op.	J. J. Skaalure, Sec.	Rosendahl	Story City	Peter F. Soenke.	Sep'tr	Test	798
	Bremer County									
67	Bremer	Bremer Creamery Co.	Co-op.	F. C. Fohagan	Bremer	Bremer	John Prier	Sep'tr	Test	327
68	*Bremer*	*Bremer*	*Co-op.*	*F. C. Fohagan*	*Bremer*			*Sep'tr.*	*Test.*	
69	Bremer	Western Douglas	Co-op.	Aug. Hogysenworth, [Sec.	Seigel	Bremer	A. F. Saddler	Sep'tr	Test.	
70	Denver	Farrington Cr'y Co.	Co-op.	Henry Steege	Waterloo	Waterloo	M. J. Johnson	Sep'tr	Test	298
71	Denver.	First Maxfield Cr'y Co.	Co-op.	Wm. Millins	Denver	Waverly	W. McKeen	Sep'tr	Hd.	

72	Frederica	Douglas Center Cr'y Co.	Co-op.	D. D. Cronkhite, Sec.	Frederica	Tripoli	Frank Finch	Sep'tr	Test.	
73	Frederica	Frederica	Ind	Gardner Murphy	Boston, Mass.	Tripoli	Robert Maillie	Sep'tr	Hd.	
74	*Janesville	Janesville Creamery	Ind	Fowler Company	Janesville	Janesville	A. M. Royce	Sep'tr	Test.	
75	Klinger	Klinger Creamery	Ind	C. H. Diekman	Klinger	Dunkerton	C. H. Diekman	Sep'tr	Hd.	
76	Maxfield	Artesian Creamery Co.	Co-op.	H. Graening, Sec.	Maxfield	Waverly	H. A. Griese	Sep'tr	Hd.	
77	Plainfield	Horton Cr'y Stock Co.	Stk Co	H. S. Ingham, Pres.	Horton	Plainfield	E. Potter	Sep'tr	Test.	635
78	Plainfield	Cedar Vale Cr'y Co.	Co-op.			Plainfield	O. E. Gaffin	S.& G.C.	Test.	791
79	Sumner	Climax Creamery Co.	Stk Co	Henry Specht, Sec.	Sumner	Sumner	Fred Engel	Sep'tr	Hd.	
80	Sumner	Little Valley Cr'y Co.	Co-op.	John Schwake, Sec.	Buck Creek	Sumner	F. M. Zell	Sep'tr	Hd.	
81	Sumner	Spring Fountain	Stk Co			Sumner	Otter Meyerhoff	Sep'tr	Hd.	
82	Tripoli	Crane Creek Cr'y Co.	Co-op.	C. Holm, Pres.	Tripoli	Tripoli	Wm. Ducker	Sep'tr	Hd.	
83	Tripoli	Fremont Creamery Co.	Co-op	A. D. Chapin, Sec	Tripoli	Tripoli	W. W. Day	Sep'tr	Test.	789
84	Tripoli	Golden Key	Ind	Wm. H. Meyerhoff	Key	Tripoli	H. J. Meyerhoff.	Sep'tr	Hd.	
85	Tripoli	Maxfield	Co-op.	C. Jahuke, Sec.	Tripoli	Tripoli	Henry Thier	Sep'tr	Hd.	
86	Tripoli	Potter's Siding Cr'y	Co-op.	Wm. Bany	Tripoli	Tripoli		Sep'tr.		
87	Tripoli	Tripoli Creamery Co.	Co-op.	F. W. Meier, Sec.	Tripoli	Tripoli	F. C. Oltrogge	Sep'tr	Hd.	766
88	Tripoli	Wapsie Valley Cr'y Co.	Co-op.	O. McCumber, Pres.	Wapsie	Tripoli	Daniel Biener	Sep'tr	Hd.	150
89	Waverly	La Fayette	Co-op.	B. Cornforth	Waverly	Waverly	Henry Piegors	Sep'tr	Test.	154
90	Waverly	Riverside	Ind	Edward Brula	Waverly	Waverly	Edward Brula	Sep'tr	Test.	228
91	Waverly	Washington Cr'y Co.	Co-op.	E. J. Thies, Sec.	Waverly	Waverly	H. J. Freie	Sep'tr	Test.	687
	Buchanan County.									
92	Aurora	Elliott & Speed	Ind	Elliott & Speed	Aurora	Aurora	W. A. Speed	Sep'tr	Test.	355
93	Brandon	Brandon Creamery	Ind.	Wm. Brady	Brandon	Mt. Auburn	Henry Brady	Sep'tr	Test.	149
94	Fairbank	Fairbank F'mr's Cr'y Co	Co-op.	E. Sanborn, Sec.	Fairbank	Fairbank	Marvin Higby	Sep'tr	Test.	710
95	Hazelton	Hazleton F'mr's Cr'y Co	Co-op.	L. A. Brush, Sec.	Hazleton	Hazleton	M. W. Ashby	Sep'tr	Test.	54
96	Independence	Independence	Ind	Weins-Shillinglaw	Independence	Independence	James McBride	Sep'tr	Test.	

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	Buchanan County.									
97	Independence.	Vista	Co-op	W. H. Cook, Sec	Independence.	Independence.	Wm. Evens	Sep'tr	Test	750
98	Jesup	Jesup Creamery Co	Co-op.	James Dalton, Sec.	Jesup	Jesup	C. R. Fuller	Sep'tr	Test	174
99	Lamont	Lamont Creamery Co	Co-op.	J. T. Trezona, Sec.	Lamont	Lamont	C. Massey	Sep'tr	Test	783
100	Masonville	Monti	Ind.	J. A. Donnelly	Monti	Masonville	J. A. Donnelly	Sep'tr	Hd.	
101	Newton Center	Newtonville Spt'r Cr'y.	Ind.			Winthrop	M. S. Cook	Sep'tr	Hd.	257
102	Otterville	Otterville Creamery Co	Co-op.	W. W. Pratt, Pres.	Otterville	Independence.	Martin Yundt	Sep'tr	Test	187
103	Rowley	Rowley Co-op. Cr'y Co.	Co-op.	A. F. Bosworth, Sec.	Rowley	Rowley	Jonathan Polan	Sep'tr	Test	743
104	Stanley	Stanley Creamery Co	Co-op.	W. C. Pond, Pres	Stanley	Stanley	Frank Strong	Sep'tr	Test.	
105	Walker Linn Co	Homer Creamery	Ind.	W. W. Wilde	Walker	Walker	John Hasner	Sep'tr	Test.	
106	Winthrop	North Byron	Ind.	S. M. Hazelrigg	Winthrop	Winthrop	S. M. Hazelrigg.	Sep'tr	Test.	
107	Winthrop	Winthrop Creamery	Ind.	Plank Bros	Winthrop	Winthrop	W. H. Plank	Sep'tr	Test	173
108	*Winthrop*	*Quasqueton*	*Ind.*	*Plank Bros*	*Winthrop.*			*Sep'tr*	*Test.*	
	Buena Vista County.									
109	Alta	Alta	Ind.			Alta	E. K. Gurnsey	Sep'tr	Test	813
110	Marathon	Fairfield Creamery Co.	Co-op.	O. G. England	Marathon	Marathon	J. A. Smith	Sep'tr	Test.	
111	Marathon	Marathon	Ind.	E. R. Stangland	Marathon	Marathon	P. Linstrom	Sep'tr	Test	89
1 2	Newell	Coon River Co-op. C'ry	Co-op.	Hans C. Kruse	Newell	Newell	P O Flarkegaard	Sep'tr	Test	797
113	Newell	Newell Creamery	Ind.	C. Nielson	Newell	Newell	Geo. Ellison	Sep'tr	Test	253

114	*Newell*	*Boese*	*Ind.*	*C. Nielson*	*Newell*			*Sep tr*	*Test*	
115	*Newell*	*Cole*	*Ind.*	*C. Nielson*	*Newell*			*Sep'tr*	*Test.*	
116	**Peterson, Clay Co.**	**Crescent**	**Ind.**	**Pick & Collins**	**Peterson, Clay Co.**	**Peterson**	**E. W. Collins**	**Sep'tr**	**Hd.**	
117	**Storm Lake**	**Storm Lake Creamery**	**Ind.**	**Huck Bros**	**Storm Lake**	**Storm Lake.**	**Chas. Huck**	**Sep'tr.**		
	Butler County									
118	Aplington	Aplington Creamery	Ind.	John Iblings	Aplington	Aplington	John Iblings	Sep'tr	Hd.	
119	Aplington	Hitesville Creamery	Ind.	James P. Johnston	Hitesville	Bristow		Sep'tr	Hd.	
120	Aplington	Monroe Central C'ry	Co-op	A. Dutjess	Aplington	Aplington	Wm. Lenius	Sep'tr	Hd	17
121	Austinville	White Rose	Ind.	Paterson&BodeBros	Austinville	Austinville	Sam Peterson	Sep'tr	Hd.	
122	Bristow	Clover Lawn	Ind.	Haven & Moorehead	Bristow	Bristow	E. E. Jones	Sep'tr	Test	42
123	*Bristow*	*Aredale*	*Ind.*	*Haven & Moorehead*	*Bristow*			*Sep'tr*	*Test*	23
124	Clarksville	Oak Grove C'ry Ass'n	Co-op	C. Doty, Pres	Clarksville	Clarksville	E. D. Wilcox	S. & G.C.	Test.	
125	Durmont	Clutterville Creamery	Co-op	A. B. Watson, Sec.	Clutterville	Durmont	James Santee	Sep'tr	Test	508
126	Greene	Cold Water Co-op. D. A	Stk Co	J. W. Williams, Sec.	Greene	Greene	L. J Sargant	G. C.		
127	New Hartford.	Beaver Creamery Co	Co-op	D. L. Hurlbut, Sec.	New Hartford.	New Hartford.	J. A. Ranney	Sep'tr	Test	182
128	New Hartford.	New Hartford	Ind	Wait & Curtis	New Hartford.	New Hartford.	W. C. Curtis	Sep'tr	Hd.	
129	Parkersburg	Parkersburg Creamery.	Ind	Codner & Palmer	Parkersburg	Parkersburg	W. H. Codner	Sep'tr	Hd	762
130	Parkersburg	Star	Ind	W. J. Daniels	Parkersburg	Parkersburg	W. J. Daniels	Sep'tr	Test	20
131	Shell Rock	Columbia Creamery	Ind	Isaac Hull	Coster	Shell Rock	Isaac Hull	Sep'tr	Hd.	
132	Shell Rock	Shell Rock Creamery	Co-op	H. H. Goodsell, Sec.	Shell Rock	Shell Rock	Jno. Richardson	Sep'tr	Test	89
133	Shell Rock	Star Co-op. Creamery	Co-op.	L. H. Mead	Shell Rock	Shell Rock	J. H. Kublank	Sep'tr	Hd.	
134	Shell Rock	Victory	Co-op.	J. M. Cass, Sec.	Waverly	Shell Rock	C. E. Austin	Sep'tr	Test	244
135	Swanton	Albion Creamery	Co-op.	E. S. Philo, Sec	Swanton	New Hartford.	Otis Courbate	Sep'tr	Test.	
	Calhoun County.									
136	Lake City	Elm Grove Creamery	Ind	Fritsimmons& Batie	Elm Grove	Lake City	J.J.Fritsimmons	Sep'tr	Test	632
137	Fonda	Williams' Creamery	Ind	R. F. Beswick	Fonda	Fonda		Sep'tr	Test	311

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	Calhoun County.									
138	Jolley..........	Plannet..................	Ind...	H. A. Albrecht......	Pomeroy.......	Knoke..........	John Knoke.....	Sept'r..	Hd.	
139	Manson........	Manson.................	Ind...	G. B. Moon, Mgr.....	Manson........	Manson........	G. B. Moon......	Sep'tr..	Test.	
140	Pomeroy......	Twin Lake Co-op. Cr'y.	Co-op.	C. J. Hartling, Sec..	Pomeroy.......	Pomeroy.......	Olen Olson......	Sep'tr..	Hd....	328
141	Pomeroy......	Pomeroy Co-op. Cr'y....	Co-op.	J. H. Hanken, Pres..	Pomeroy.......	Pomeroy.......	Nan'eA.Hanken	Sep'tr..	Test..	866
142	Rockwell City.	Rockwell City B. & C. Co	Co-op.	T. C. Gregg, Sec.....	Rockwell City.	Rockwell City.	T. E. Garity.....	G. C.		
	Carroll County									
143	Arcadia........	Arcadia...	Ind...	Ed. Rehker..........	Arcadia........	Arcadia........	Crist Madison...	Sep'tr..	Hd....	360
144	Breda..........	Breda....................	Ind...	Ed. Rehker..........	Arcadia........	Breda..........	....	Sep'tr..	Hd.	
145	Dedham........	Dedham Creamery......	Ind...	....	Dedham........	Dedham	B. L. Fest.......	Sep'tr..	Test..	690
146	Halbur.........	Excelsior...............	Ind...	Hoelker Bros........	Halbur.........	Halbur.........	A. Hoelker......	Sep'tr..	Hd....	294
147	Manning.......	Manning Creamery.....	Ind...	Hoelker Bros...	Manning.......	Manning.......	W. T. Miller.....	Sep'tr..	Hd.	
148	Mt. Carmel.....	Mt. Carmel Creamery...	Ind...	Ed. Rehker..........	Arcadia...	Breda..........	....	Sep'tr..	Hd.	
149	Roselle.........	Rose Valley............	Ind...	C. Kohorst..........	Roselle........	Halbur.........	C. Kohorst	Sep'tr..	Hd.	
150	Willey.........	Willey Creamery Co....	Stk Co	B. Greteman, Sec...	Willey.	Dedham........	George Allard..	Sep'tr..	Test..	889
	Cass County.									
151	*Cumberland*....	*Elgin Creamery Co*.......	*Ind*...	*O. Sands, Pres*.......	*Chicago, Ill*.....	....	....	*Sep'tr*...	*Test.*	
152	*Massena*.......	*Elgin Creamery Co*.......	*Ind*...	*O. Sands, Pres*.......	*Chicago, Ill*.....	....	....	*Sep'tr*...	*Test.*	
153	*Wiota*.........	*Elgin Creamery Co*.......	*Ind*...	*O. Sands, Pres*..	*Chicago, Ill*.....	....	....	*Sep'tr*...	*Test.*	
154	Lewis..........	Lewis Creamery	Co-op.	....	....	Lewis..........	Proprietor......	G. C.		

155	Marne..........	Marne Co-op. Cr'y Co...	Co-op.	J. A. Walsh, Pres ...	Atlantic	Marne..........	H. Henrickson..	G. C.....	....	259
	Cedar County.									
156	Durant	Durant But. & Ch. Ass'n	Stk Co	Chas. Largenfrey...	Durant	Durant	Henry Puck....	Sep'tr ..	Hd.	
157	Bennett	Golden Star Creamery..	Ind ...	Aug. Hinrichs & Co.	Lowden........	Bennett........	W. H. Kroeger..	S. & G.C.	Hd.	
158	*Bennett*	*Golden Star and Bennett.*	*Ind* ...	*Aug. Hinrichs & Co...*	*Lowden.*........	....	....	*S. & G.C.*	*Hd*....	117
159	Lowden	Union Farmers'Cr'y Co	Co-op.	Henry Schwaegermann, Sec.	Lowden	Lowden	....	Sep'tr ..	Hd....	774
160	Springdale....	Hopewell	Ind...	C. G. Eves	Springdale	West Branch..	C. G. Eves.......	S. & G.C.	Hd....	41
161	Tipton..........	Cedar Creamery........	Ind ...	H. L. Dean...........	Tipton	Tipton	H. L. Dean. ...	G. C.		
	Cerro Gordo County.									
162	*Clear Lake....	Clear Lake B. & C. F'ty.	Ind...	G. W. Kennedy......	Thornton.......	Clear Lake	G. W. Kennedy..	Sep'tr ..	....	718
163	Clear Lake.....	Model Co-op. Dairy A'n.	Co-op.	W. Specht............	Clear Lake....	Ventura	C. R Conway....	Sep'tr ..	Test..	297
164	Mason City....	Mason City Creamery...	Ind...	H. J. Turner.........	Mason City....	Mason City....	J. V. Tyler......	Sep'tr ..	Test..	299
165	Owen Center..	Owen Center Creamery	Ind...	Fish & Colvin	Rockford	Rockford	C. T. Fish........	Sep'tr ..	Test..	356
166	Plymouth......	Plymouth	Ind...	S. Hactong...........	Plymouth	Plymouth......	S. Hactong......	Sep'tr ..	Test..	744
167	Portland.......	Portland................	Ind...	Chas. R. Fink........	Portland.......	Portland.......	A. J. Mitchle....	Sep'tr ..	Test..	66
168	Rock Falls.....	Mayflower	Ind ...	J. F. Cochonour.....	Rock Falls.....	Rock Falls....	J. F. Cochonour.	S. & G.C.	Test..	155
169	Rockwell	Rockwell Creamery Co.	Co-op.	G. H. Fuller, Sec....	Rockwell	Rockwell	John Gerber	Sep'tr ..	Test..	291
170	Swaledale......	Pleasant Valley.........	Ind...	Foord & Woodward	Swaledale......	Swaledale	Geo. Leonard...	S. & G.C	Hd.	
171	Thornton	Thornton	Ind...	G. W. Kennedy......	Thornton.......	Thornton.......	Guy Thomas....	S. & G.C.	Test..	776
	Cherokee County.									
172	Aurelia	Aurelia	Ind...	Knirtzen & Matson..	Aurelia	Aurelia.........	P. Matson........	Sep'tr ..	Hd....	358
173	Cleghorn.......	Cleghorn Creamery.....	Ind...	Robinson Bros.......	Cleghorn	Cleghorn	C. W. Stevens...	Sep'tr ..	Hd.	
174	Larrabee.......	Larrabee................	Ind...	Alex Younger.......	Larrabee.......	Larrabee.......	Alex Younger..	Sep'tr ..	Hd.	
175	Marcus	Marcus Creamery.......	Ind...	O. S. Knoes..........	Marcus	Marcus	G. Sikens........	Sep'tr ..	Hd.	
176	Meriden	Meriden Creamery......	Ind...	Fuller & Adams.....	Meriden	Meriden	Proprietor.......	Sep'tr ..	Hd.	
177	Quimby	Shaul & Stanford's C'ry.	Ind...	Shaul & Stanford....	Quimby	Quimby	A. J. Stanford...	Sep'tr ..	Hd.	

CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by an individual, co-operative or stock comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Chickasaw County.									
178	Alta Vista. ...	Alta Vista F'rs Cr'y A'n	Co-op.	Wm. Vick, Sec......	Alta Vista.....	Alta Vista.....	C. C. Capper.....	Sep'tr ..	Test..	55
179	Bassett	Cloverdale Creamery...	Co-op.	L. J. Young, Sec.....	Bassett.........	Bassett........	Seymour Butler	Sep'tr ..	Test..	638
180	Boyd	Boyd Farmers Cr'y.. ...	Co-op.	J. De Battignies, Sec	Boyd	Boyd...........	L J. Gibbs	Sep'tr ..	Test.	
181	Deerfield.......	Deerfield	Co-op	Geo. Brown, Sec.....	Deerfield.	Alta Vista.....	Chas Meader....	Sep'tr ..	Test..	676
182	Devon.........	Devon F'rs Cr'y Ass'n..	Co-op.	E. P. Sheffield, Sec..	New Hampton.	Devon..........	Geo. D. Holdren.	Sep'tr ..	Test..	301
183	Fr'dericksburg	Dresden Creamery......	Ind...	John H. Kolthoff ..	Williamstown	New Hampton.	C. Struble.......	Sep'tr ..	Test.	
184	Fr'dericksburg	Fredericksburg Cr'y....	Co-op.	William Bee, Sec....	Fred'ricksburg	Fred'ricksburg	E. F. Beebe......	Sep'tr ..	Test..	184
185	Ionia...........	Ionia Farmers Cr'y Co..	Co-op	J. F. Cogley, Mgr ...	Ionia...........	Ionia...........	....	Sep'tr ..	....	168
186	Jacksonville...	Jacksonville Co-op.Cr'y	Co-op.	C. E. Pierce, Sec.....	Lawler.........	New Hampton.	R. E. White.....	Sep'tr ..	Test..	104
187	Jerico..........	Jerico's Creamery	Co-op.	W. P. Reed, Sec......	Jerico..........	New Hampton	John P. Whalen.	Sep'tr ..	Test..	886
188	Lawler.........	Lawler Creamery Ass'n	Co-op.	Peter O'Brien, Pres	Lawler.........	Lawler.........	John Sullivan ..	Sep'tr ..	Test .	634
189	Little Turkey.	Little Turkey C'y Ass'n	Co-op.	A. D. Kirshman, Sec	Little Turkey.	Lawler.........	T. S. Larson.....	Sep'tr ..	Test..	281
190	Nashua........	Fremont Creamery Co..	Stk Co	A. M. Bethke, Mgr..	Prosper........	Nashua.......	W. J. Simmons..	Sep'tr ..	Test.	645
191	Nashua........	Nashua Creamery......	Co-op.	E. V. R. Hall, Pres..	Nashua...... .	Nashua.......	W. A. Blinn.....	S.& G.C.	Test..	639
192	New Hampton.	New Hampton Cr'y	Ind...	John H. Kolthoff....	Williamstown	New Hampton	Ph. Wesp	Sep'tr ..	Test..	23
193	N. Washington	N.Washingt'n C'y Ass'n	Co-op.	Geo. Rudolph, Sec ..	N. Washington	Devon..........	Frank Braey....	Sep'tr ..	Test..	997
194	Republic.	Republic Co op. C'y Co	Co-op.	J. W. Pierce, Sec.....	Republic.......	Nashua	J. J. Ross.......	Sep'tr ..	Test..	640
195	Williamstown .	Williamstown Cream'y.	Ind...	J. H. Kolthoff.......	Williamstown .	New Hampton.	F. G. Kolthoff...	Sep'tr ..	Test ..	25

196	Williamstown	Williamstown C'y Ass'n	Co-op.	H. H. Bailey, Pres	Williamstown	New Hampton	W. R. Leighton	Sep'tr	Test.	
	Clarke County.									
197	Murray	Murray	Ind	O. Sands, Pres.	Chicago, Ill	Murray	James Currie	Sep'tr	Test.	
198	*Murray*	*Hopeville*	*Ind*	*O Sands, Pres*	*Chicago, Ill*			*Sep'tr*	*Test.*	
199	*Murray*	*Washington*	*Ind*	*O. Sands, Pres*	*Chicago, Ill*			*Sep'tr*	*Test.*	
200	*Woodburn	Farmers' B. & C. Ass'n.	Co-op.	H. P. Halling	Woodburn	Woodburn	H.W. Hasslinger	Sep'tr	Test	716
	Clay County.									
201	Dickens	Sioux Valley	Ind	C. W. Parsons	Dickens	Dickens	A. Vavsicker	Sep'tr	Test	620
202	Everly	Spring Creek Cr'y Co	Co-op.	Ed. Moeller, Sec	Everly	Everly	Chris Peterson	Sep'tr	Test	79
203	Fostoria	Fostoria Creamery Co.	Co-op.	Jos. O'Brien, Pres	Fostoria	Fostoria	H.A. Shellenberger	Sep'tr	Test	871
204	Marathon	Mud Lake Creamery Co	Co-op.	L. Wesche, Sec	Marathon	Marathon	F. DeLong	Sep'tr	Test	875
205	Peterson	Star	Ind	Dilger & Beach	Willow Creek	Peterson	W. I. Dilger	Sep'tr	Test	787
206	Spencer	Riverton Creamery Co	Stk Co	A J Paddock, Sec	Spencer	Spencer	O. B. Ross	Sep'tr	Test	292
	Clayton County.									
207	Communia	Communia Cr'y Ass'n	Co-op.	Henry Wistrick, Sec.	Communia	Littleport	John Stemmer	Sep'tr	Test	759
208	Edgewood	Bear Creek	Ind	H. F. Beyer	Edgewood	Edgewood	A. B. Jones	Sep'tr	Test	334
209	Edgewood	Fidelity	Ind	H. F. Beyer	Edgewood	Edgewood	Ed. J. Whipple	Sep'tr	Test	338
210	Elkader	Highland Cr'y Ass'n	Co-op.	P. J. Orr	Elkader	Elkader	D. Whipple	Sep'tr	Test	188
211	Elkader	Elkader Creamery	Ind	A. O. Elvidge	Elkader	Elkader	L. Bernatz	Sep'tr	Test.	
212	Elkport	Elkport Creamery	Ind	A. O Elvidge	Elkader	Elkport	Ole Houge	Sep'tr	Test.	
213	Farmersburg	Farmersb'rg Co-op. Cr'y Co.	Co-op.	C. W. Meier	Farmersburg	Farmersburg	F.J. Dunbenberger	Sep'tr	Test	857
214	Garnavillo	Garnavillo Farmers'	Co-op	E. W. Kregel, Sec	Garnavillo	Clayton	C. B. Chandler	Sep'tr	Test	199
215	Giard	Giard	Ind	A. O. Elvidge	Elkader	Froelich	A. C. Kingsbury	Sep'tr	Test.	
2 6	Littleport	Littleport	Ind	A. O. Elvidge	Elkader		George Gould	Sep'tr	Test.	
217	Luana	Luana	Co-op.	Emil Prefahl, Sec	Luana	Luana	W. S. Gould	Sep'tr	Test	27
2.8	McGregor	McGregor	Co-op	W. I. Knowles, Sec	McGregor	McGregor	C. C. Corlett	Sep'tr	Test	296
219	Mederville	Mederville	Ind	Wm. Brinkhouse	Mederville	Mederville	C. Walker	Sep'tr	Test.	

CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by an individual, co-operative or stock comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Clayton County.									
220	Osborne	Osborne	Ind	A. O. Elvidge	Elkader	Osborne	F. J. Schroeder	Sep'tr	Test	162
221	Osterdock	Osterdock Cr'my Co	Co-op.	E. A. Bush	Osterdock	Osterdock	Wm. Wamsley	Sep'tr	Test	867
222	Read	Read Creamery Co	Stk Co	H. W. Wilke, Sec	Elkader	Elkader	G. G. Smith	Sep'tr	Test	109
223	St. Olaf	St. Olaf Creamery	Ind	A. O. Elvidge	Elkader	St. Olaf	Glint Carrier	S.& G.C.	Test	161
224	Strawberry Pt.	Strawb'y Pt F'rs Cr'y As	Co-op.	James Newberry	Strawberry Pt.	Strawberry Pt.	H. R. Schwartz	Sep'tr	Test	678
225	Volga City	Farmers' Co-op. Cr'y Co	Co-op.	O. A. Phillips, Sec	Volga City	Volga City	B. Jones	Sep'tr	Test	325
226	Watson	Blue Grass F'rs Cr'y Co.	Co-op.	Jno. Geraghty, Sec	Watson	Monona	Geo. Turner	Sep'tr	Test	80
	Clinton County.									
227	Andover	Andover	Ind	John Newman	Elgin, Ill	Andover	A. H. Meyer	Sep'tr	Test	793
228	Charlotte	Shady Nook	Ind	John Newman	Elgin, Ill	Charlotte	T. H. Brinker	Sep'tr	Test	642
229	Delmar	Delmar	Ind	John Newman	Elgin, Ill	Delmar	C. C. Likens	Sep'tr	Test	353
230	Elwood	Elwood	Ind	John Newman	Elgin, Ill	Elwood	F. Lembaugh	Sep'tr	Test	795
231	*Brown*	*Brown*	*Ind*	*John Newman*	*Elgin, Ill*			*Sep'tr*	*Test.*	
232	*Elwood No. 26*	*Diamond Creamery Co*	*Ind*	*Simpson, McIntree &* [Co.	*Boston, Mass*			*Sep'tr*	*Test.*	
233	Goose Lake	Goose Lake Creamery	Ind	Kruse & Jenson	Goose Lake	Goose Lake	S. I. Allen	Sep'tr	Hd.	
234	Grand Mound	Gr. Mound Co-op.Cr'yCo	Stk Co	C J. Schunter, Sec	Grand Mound	Grand Mound	Henry Vetter	Sep'tr	Hd.	
235	*Grand Mound*	*Buena Vista*	*Stk Co*	*C. J. Schunter*	*Grand Mound*			*Sep'tr*	*Hd.*	
236	*Lost Nat'n No.28*	*Diamond Creamery Co*	*Ind*	*Simpson, McIntree &* [Co.	*Boston, Mass*			*Sep'tr*	*Test.*	

237	Quigley	Deep Creek	Ind...	John Newman	Elgin, Ill	Quigley	O. H. Mower	Sep'tr ..	Test ..	794
238	*Smitht'wn No 19*	*Diamond Creamery Co...*	*Ind....*	*Simpson, McIntree & Co.*	*Boston, Mass...*	....	....	*Sep'tr...*	*Test.*	
239	*So. Grove No. 22*	*Diamond Creamery Co...*	*Ind....*	*Simpson, McIntree & Co*	*Boston, Mass...*	....	....	*Sep'tr...*	*Test.*	
240	Teed's Grove..	Clover Leaf	Ind ...	Chas. Allen, Sec	Teed's Grove..	Teed's Grove..	Chas. Allen	Sep'tr ..	Test ..	110
241	Welton	Welton Creamery.	Ind ...	E. C. Hinckley	Welton	Welton	F. Sallisbury	S.& G.O.	Test.	65
	Crawford County.									
242	Denison	Denison Creamery	Ind ...	Chas. E. Craft	Denison	Denison	Chas. E. Craft ..	Sep'tr ..	Test ..	194
243	Kiron	Stockholm	Ind ...	Knut Mattson	Kiron	Odebolt	Knut Mattson..	Sep'tr ..	Hd.	
244	*Kiron ....*	*Otter Valley ....*	*Ind....*	*Knut Mattson ....*	*Kiron ....*	....	....	*Sep'tr...*	*Hd.*	
245	Manilla	Manilla	Ind ...	Wm. Pruter	West Side	Manilla	L. E. Anthony ..	G. O.		
246	West Side	Hays Township Cr'my..	Ind ...	Wm. Pruter	West Side	West Side	Hans Rohwer...	Sep'tr ..	Test ..	668
247	*Aspinwall ......*	*Aspinwall ....*	*Ind....*	*Wm. Pruter . ...*	*West Side ....*	....	....	*Sep'tr...*	*Test.*	
	Dallas County									
248	Dallas Center..	Dallas Center	Co-op.	W. H. Hall	Dallas Center.	Dallas Center.	James Coleman.	S.& G.O.	Test.	
219	Dexter	Dexter Creamery	Ind ...	K. C. Pierce	Dexter	Dexter	H. F. Pierce	Sep'tr ..	Test ..	180
250	Perry	Red Star Creamery	Ind ...	J. Moody & Son	Perry	Perry	J. W. Morgan...	G. O.		
251	Van Meter	Zieman Creamery	Ind ...	Wm. Zieman	Van Meter	Van Meter	R. C. Storch	S.& G.O.	Test ..	281
252	Waukee	Waukee Co-op. Cr'y Co.	Co-op.	J. S. Shannon	Waukee	Waukee	M. C. Crispin	Sep'tr ..	Test ..	190
253	Woodward	Woodward	Ind ...	H. P Calenky	Woodward	Woodward	H. P. Calenky ...	Sep'tr ..	Test ..	204
	Davis County.									
254	Bloomfield	Bloomfield	Ind ...	W. H. Davis	Bloomfield	Bloomfield	W. H. Davis	S.& G.O.	Test ..	730
255	Floris	Floris Creamery	Ind ...	C. B. Caldwell & Son	Floris	Floris	W. P. Caldwell..	Sep'tr ..	Test ..	135
256	Pulaski	Pulaski	Ind ...	J. J. Miller	Pulaski	Pulaski	W. S. Stover	S. & G..	Test.	
	Delaware County.									
257	Almoral	Almoral Creamery Co..	Stk Co	F. L. Carpenter, Sec.	Almoral	Almoral	Ed. M. Newcomb	Sep'tr ..	Test ..	114
258	*Argand No. 14..*	*Diamond Creamery Co...*	*Ind ...*	*Simpson McIntire....*	*Boston, Mass...*	....	....	*Sep'tr...*	*Test.*	
259	Barryville.. ..	Barryville Co-op. Cr'y..	Co-op.	C. C. Barry, Sec	Barryville	Manchester	Thos. Sheldon ..	Sep'tr ..	Test ..	740

CREAMERY LIST—CONTINUED.

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	Delaware County.									
260	Colesburg	Colesburg Creamery....	Co-op	R. C. Currie, Sec. ...	Colesburg......	Osterdock	A. Landis, Jr....	Sep'tr ..	Test..	236
261	Delaware......	Delaware Creamery Co	Co-op.	C. A. Pierce, Sec....	Delaware......	Delaware......	P. F. Madden ...	Sep'tr ..	Test..	86
262	Delhi.........	Pleasant Valley Cr'y...	Ind...	Allison Bros.........	Delhi..........	Earlville......	F. E. Munn......	Sep'tr ..	Test..	870
263	Delhi..........	Silver Spring...........	Stk Co	F. S. Beal...........	Delhi.	Delhi...........	C. A. Howard ...	Sep'tr ..	Test..	141
264	Earlville......	Earlville...............	Ind...	T. Dickson..........	Earlville	Earlville	A. C. Bender....	Sep'tr ..	Test..	130
265	Earlville......	Gilt Edge Creamery....	Ind...	J. M. Dunn & Co.....	Earlville	Earlville	J. M. Dunn......	Sep'tr ..	Test.	
266	Earlville......	Linwood Creamery Co..	Co-op	Wm. Werderhoff....	Petersburgh ..	Earlville	Frank Scott.....	Sep'tr ..	Hd.	
267	Ehler...... ...	Henderson Creamery...	Ind...	J. Henderson & Sons	Ehler	Ehler	....	Sep'tr ..	Test.	
268	Ehler.........	Willow Grove Creamery	Co-op.	E. C. Dolan, Sec.....	Ehler	Ehler	S. S. McCready..	Sep'tr ..	Test..	763
269	Golden.........	Golden Creamery.......	Ind...	Ancott & Cowl......	Golden.........	Golden.........	A. R. Ancott....	Sep'tr ..	Test..	22
270	Greeley	Greeley Farmers Cr'y..	Co-op.	B. A. Barker, Sec....	Greeley	Greeley	F. J. Kleckner..	Sep'tr ..	Test..	370
271	Hazel Green...	Hazel Green Creamery.	Ind...	Frank B. Dickey....	Hazel Green...	Ryan..........	F. L. Houston...	Sep'tr ..	Test..	239
272	*Hazel Green....*	*Broadway...............*	*Ind...*	*Frank B. Dickey.....*	*Hazel Green....*	....	....	*Sep'tr...*	*Test.*	
273	Hopkinton....	Hazel Green Co-op. Cr'y Co.	Co-op.	E. R. File, Sec.......	Hazel Green...	Hopkinton	Wm. Kenney.. .	Sep'tr .	Test..	115
274	Hopkinton ..	Hopkinton Co-op. Cr'y Co	Co-op	M. L. McGlade, Sec..	Hopkinton	Hopkinton ...	J. H. Griffith ..	Sep'tr ..	Test..	784
275	Hopkinton.....	Keystone...............	Ind...	J. W. Merrill	Cedar Falls....	Hopkinton ...	L. R. Burnham..	Sep'tr ..	Hd.	
276	Manchester....	Manchester Co-op. Cr'y	Co op.	F. J. Shelden, Sec...	Manchester ...	Manchester....	C. D. Elder......	Sep'tr ..	Test..	718
277	Manchester ...	Mead's Creamery.......	Ind...	C. W. Mead & Son...	Manchester ...	Thorpe.	W. D. Mead. ..	Sep'tr ..	Test..	93

278	Manchester....	Spring Branch Co-op. Cr'y Co.	Co-op.	W. J. Davis, Sec....	Manchester....	Manchester....	A. A. Palmer....	Sep'tr..	Test..	76
279	Petersburgh...	Bear Grove Creamery Co..	Co-op.	Joseph Gebhordt, Sec....	Petersburgh...	Dyersville.....	Jacob Schmidt..	Sep'tr..	Test..	641
280	Petersburgh...	Petersburgh Co-op. Cr'y Co.	Co-op.	F. J. Klostermann,	Petersburgh...	Dyersville.....	Frank Rubly....	Sep'tr..	Hd.	
281	Sand Spring...	Sand Spring Co-op. Cr'y Co.	Co-op.	F. E. Wood, Jr.......	Sand Spring....	Sand Spring....	W. R. Crabb.....	Sep'tr..	Test..	96
282	Thorpe.........	Honey Creek...........	Ind...	H. F. Beyer..........	Edgewood....	Edgewood......	W. K. Pollard...	Sep'tr..	Test..	73
283	Thorpe.........	Thorpe.................	Ind...	Harris & Co..........	Jesup..........	Thorpe........	J. Schaum......	Sep'tr..	Test.	
	Dickinson County.									
284	Everly.........	Westport Creamery.....	Ind...	C. C. Painter.........	Everly..........	Everly..........	C. R. Foster.....	Sep'tr..	Test..	246
285	*Spirit Lake...	Spirit Lake B. & C. F'ty	Ind...	Painter & Painter..	Spirit Lake....	Spirit Lake....	C. A. Painter....	Sep'tr..	Test..	875
	Dubuque County.									
286	Balltown.......	Balltown Co-op. Cr'y Co	Co-op.	C. Harrington, Sec..	Balltown.	Waupeton......	Joseph Platt....	Sep'tr..	Test.	
287	Bernard........	Austin..................	Co-op.	David Stanton, Sec.	Cascade........	Bernard........	Chas. Hunter...	Sep'tr..	Hd....	705
288	Cascade........	Cascade Co-op. Cr'y Co.	Co-op.	T. A. Hamil, Sec....	Cascade........	Cascade........	S. M. Adamson..	Sep'tr..	Hd....	885
289	Cascade........	Hazel Creamery.........	Ind...	W. C. Aitchison.....	Cascade........	Cascade........	W. C. Aitchison.	Sep'tr..	Hd.	
290	Cascade........	Spring Valley Cr'y Co..	Co-op.	E. M. Kearney, Sec.	Cascade........	Worthington..	H. P. Bancroft..	Sep'tr..	Test..	756
291	Cascade........	Crystal Falls...........	Ind...	Dehner & Kay.......	Cascade........	Cascade........	C. L. Kay........	Sep'tr..	Hd.	
292	Dyersville. ..	Farmers' Golden Star..	Co-op.	J. H. Prier, Sec......	Dyersville......	Dyersville......	A. Stoecke......	Sep'tr..	Hd....	632
293	Dyersville.....	Pin Oak Creamery......	Co-op.	John Crippes, Sec...	Pin Oak........	Dyersville.....	Jay B. Smith....	Sep'tr..	Test..	148
294	Epworth........	Epworth Creamery Co..	Co-op.	A. B. Wright........	Epworth......	Epworth.......	Perry Stockwell	Sep'tr..	Hd....	674
295	Farley.........	Farley Creamery Co....	Co-op.	J. F. Schoonover....	Farley..........	Farley....	C. E. Minehart..	Sep'tr..	Test..	659
296	Farley.........	John's Creek Creamery.	Ind...	Vibber & Heald... .	Farley..........	Farley.........	C. Bartolimew..	Sep'tr..	Hd.	
297	Farley.........	Pleasant View..........	Ind...	Vibber & Heald.....	Farley..........	Farley.........	John Higg.......	Sep'tr..	Hd.	
298	Fillmore.......	Fillmore Co-op. Cr'y Co	Co-op.	Wm. Craft, Sec......	Fillmore.......	Fillmore......	N. B. Francois..	Sep'tr.	Hd.	
299	Lattners.......	Lattner's Sp. Co-op.Cr..	Co-op.	E. Hansen, Sec......	Lattners.......	Graf...........	Samuel Streif...	Sep'tr..	Hd....	203
300	Lore...........	Lore Creamery Co......	Co-op.	C. Kenct, Sec........	Lore...........	Graf...........	J. W. Ford.......	Sep'tr..	Hd.	
301	Luxemburgh..	Globe.....................	Co-op.	Michael Linck, Mgr.	Luxemburgh..	Dyersville	Jake Friedman..	Sep'tr..	Test..	245

CREAMERY LIST—CONTINUED.

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	Dubuque County.									
302	Sherrill	Sherrill	Co-op.	J. C. Boleyn, Sec....	Sherrill	Sherrill	Fred Koeller....	Sep'tr ..	Hd.	
303	New Vienna...	NewVienna Cen'l Cr.Co.	Co-op.	Jos. Schermnel, Sec.	New Vienna...	Dyersville.....	Mathias Kaut...	Sep'tr ..	Hd	719
304	Peosta.........	Highlands	Ind ...	Geo. Frank..........	Peosta.........	Peosta.........	Geo. Frank......	Sep'tr ..	Test ..	238
305	Rickardsville .	Farni Creamery.........	Ind ...	John Fisher, Sec....	Rickardsville..	Durango.......	Joseph Farni....	Sep'tr ..	Hd.	
306	Rickardsville .	Oak Creamery...........	Co-op.	M. E. Regan.........	Rickardsville .	Waupeton	August Bany...	Sep'tr ..	Hd.	
307	Rockdale	Columbian..............	Ind ...	Laude Bros..........	Rockdale	Dubuque.......	Peter Hasler....	Sep'tr ..	Hd	361
308	Tivoli	Hickory Valley Cr'y Co.	Co-op.	L. F. Tegeler........	Dyersville	Dyersville	C. H. Arnold....	Sep'tr ..	Hd.	
309	Worthington ..	Central Co-op. Cr'y Co..	Co-op.	J H. White, Sec....	Worthington ..	Hopkinton.....	H. F. Lehmuhl..	Sep'tr ..	Hd.	
310	Worthington ..	Worthington Creamery.	Ind ...	W. Lattner.........	Worthington ..	Worthington...	Crist Bahler....	Sep'tr ..	Hd.	
311	Zwingle........	Zwingle Sep'tr Cr'y.....	Ind ...	Laude Bros..........	Dubuque.......	Zwingle........	....	S. & G.C.	Test.	
	Emmet County.									
312	Armstrong	Farmers' Creamery Co.	Ind ...	G. Stewart..........	Armstrong	Armstrong.....	Fred Wilcox	Sept'r ..	Test ..	626
313	Armstrong	Forsythe Creamery....	Co-op.	H. A. Gaarde, Sec ..	Armstrong	Armstrong.....	Sevart Gordon .	Sept'r ..	Test ..	695
314	Estherville	Estherville	Co-op	H. W. Words, Sec..	Estherville....	Estherville	J. A. Reid.. ...	Sept'r ..	Test ..	681
315	*Estherville.*	*Bagan's*	*Co-op*	*H. W. Words, Sec....*	*Estherville.....*	....	....	*Sept'r ..*	*Test.*	
316	Wallingford ...	Wallingford Co-op Cr'y Co.	Co op.	P. Miller, Sec........	Wallingford ...	Wallingford....	Ben Lonning. ..	Sept'r ..	Test ..	310
	Fayette County.									
317	Alpha..........	Alpha Farmers' Cr'y Co	Co-op.	A. L. Davis..........	Alpha	Waucoma	C. N. Beach.....	Sept'r ..	Test ..	63
318	Arlington	Brush Creek Farmers'..	Co-op.	C. H. Day...........	Allngton	Arlington	C. H. Day........	Sept'r ..	Test.	

319	Aurora.........	Gundlach Creamery ..	Ind...	A. O. Kingsley......	[Clayton Co Strawberry P't	Strawberry P't	Irving Tyson...	Sept'r ..	Test..	675
320	Clermont......	Clermont Valley C'ry [Co.	Co-op	A. L. RasmussenSec	Postville, Alla- [makee Co.	Clermont......	A. Erickson.....	Sept'r ..	Test.	
321	*Gundt, Clayton [Co*	*Clermont Valley C'ry Co*	*Co-op*	*A. L. Rasmussen, Sec*	*Postville Alla- [makee Co.*	....	....	*Sep'tr ..*	*Test.*	
322	Dover Mills....	Burr Oak...............	Co-op	Henry Smith, Sec...	Clermont.....	Clermont	S. H. Payne	Sept'r ..	Test..	724
323	E'gin	Elgin Farmers Dairy Co	Co-op.	A. S. Houg, Sec......	Elgin.	Elgin...........	Ed Hanson......	Sept'r ..	Test.	
324	Fairbank	Oran Creamery Co......	Co-op	J. Klenzmann	Minkler, Brem- [er Co	Fairbank	E. E Shippy.....	Sept'r ..	Hd.	
325	Fayette........	Fayette C'ry Ass'n	Co-op.	J. M. Edmunds......	Fayette........	Fayette	J. M. Speer......	Sept'r ..	Test..	287
326	Hawkeye	Hawkeye	Ind...	Bortner& Wilkening	Hawkeye	Hawkeye	A. P. Bortner...	Sept'r ..	Test..	156
327	Maynard	Harlan Co-op...........	Co-op.	A. F. Crawford, Sec.	Maynard ..	Maynard	A. D. Fasham...	Sept'r ..	Test..	362
328	Oelwein........	Jefferson	Co-op.	J H. Meyer, Sec.....	Oelwein	Oelwein........	C. H. McQueen..	Sept'r ..	Test..	140
329	Oelwein........	Oelwein Farmers' Cr'y.	Co-op.	E. E. Day, Sec.......	Oelwein	Oelwein	H. A. Miller....	Sept'r ..	Test..	109
330	Randalia	Fairview Creamery Co..	Co-op	S. A. Dietel, Sec.....	Sumner, Brem- [er Co	Randalia.	Chas. Bracy.....	Sept'r ..	Test..	15
331	Randalia	Randalia Creamery.....	Co-op.	G. D. Torrey, Sec	Randalia.......	Randalia.......	F. C. Billings....	Sept'r ..	Test..	290
332	Richfield	Richfield Creamery Co.	Co-op.	G. W. Niomann, Sec.	Richfield.......	Waucoma......	G. E Murphy...	Sept'r ..	Test.	
333	St. Lucas	Farmers' Co-op. C'ry...	Co-op	J. J. Mihus, Sec	St. Lucas	Waucoma......	H. Goebler......	Sept'r ..	Test..	172
334	Stanley	Stanley Creamery	Co-op.	Geo. Brooks, Sec....	Stanley	Stanley	F. W. Strong....	Sept'r ..	Test.	
335	Waucoma......	Bethel...................	Stk Co	A. Webster..........	Waucoma......	Waucoma......	O G. Peffer......	Sept'r ..	Test.	
336	Waucoma......	Waucoma...............	Stk Co	A. Webster, Pres....	Waucoma	Waucoma......	R. M. Barbour ..	Sept'r ..	Test..	78
337	Westgate	Westgate Creamery Co.	Co-op.	Thos Becher........	Westgate	Westgate	E. L. Bracy......	Sept'r ..	Test..	373
338	West Union....	Farmers' Dairy Co.....	Co-op.	L. W. Wilbur.	West Union....	West Union....	W. L. Tillson....	Sept'r ..	Test..	40
339	West Union....	Union Creamery........	Stk Co	E. B. Shaw, Sec	West Union....	West Union.. .	S. Peterson......	S.& G.C.	Test..	263
340	*West Union....*	*Illyria*	*Stk Co*	*E. B. Shaw, Sec......*	*West Union....*	....	....	*S. & G.C.*	*Test.*	
	Floyd County.									
341	Charles City...	Charles City C'ry Co....	Ind...	J. C. Daly...........	Charles City..	Charles City...	J. C. Daly........	S.& G.C.	Test..	164
342	Charles City...	Flood Creek Sep tr. C'ry [Co.	Stk Co.	M. A. Hirsch, Sec ...	Charles City..	Charles City...	John Haefner...	Sept'r .	Test.	

CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by an individual, co-operative or stock comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test, or by the hundred.	Dairy commissioner's test-bottle number.
	Floyd County.									
343	Floyd	Floyd	Ind	Winks & Day	Floyd	Floyd	C. A. Day	S.& G.C.	Test	693
344	Marble Rock	Marble Rock	Ind	Walker & Thomas	Marble Rock	Marble Rock	W. J. Emerson	Sept'r	Test	64
345	Niles	Niles	Ind	W. A. Madatt	Algona	Charles City	Fred Madatt	Sept'r	Test	712
346	Nora Springs	Nora Springs	Ind	R. C. Kennedy	Nora Springs	Nora Junction.	R. C. Kennedy	Sept'r	Test	10
347	Powersville	Pleasant Grove C'ry	Ind	Powers & Weston	Powersville	Nashua		Sept'r	Test.	
348	Rockford	Rockford Co-op. Dairy [Ass n.	Co-op.	O. L. Crowell, Sec	Rockford	Rockford	W. J. Grimes	G. C.		
	Franklin County.									
349	Ackley	Edna	Ind	J. Martin & Son	Ackley	Ackley	C. Strassburg	S.& G.C.	Hd	701
350	Chapin	Chapin Creamery	Ind	C. Nietert	Chapin	Chapin	C. Nietert	S.& G.C	Test	77
351	Faulkner	Faulkner	Ind	Zeman Bros	Faulkner	Faulkner	Eman Zeman	Sep'tr	Test	81
352	Geneva	Geneva Creamery	Ind	I. W. Myers	Hampton	Geneva	B. Peterson	S.& G.C.	Test.	
353	Hampton	Hampton Creamery	Ind	Jule & Kennedy	Hampton	Hampton	J. Kennedy	S.& G.C.	Test.	
354	Hampton	Pleasant Ridge	Ind	McKeller & Cochran	Hampton	Hampton	L. C. Cochran	Sep'tr	Hd.	
355	Latimer	Hamilton Cr'y Co-op.Co	Co-op	F. Rodemeyer & Son	Hampton	Hampton	Geo. Jorgensen.	Sep'tr	Test	118
356	Popjoy	Popjoy Co-op. Cr'y Co	Co-op.	J. A. Iverson, Sec	Dows	Popjoy	J. M. Tupper	Sep'tr	Test.	
357	Sheffield	Sheffie'd Co-op. Cr'y Co	Co-op.	L. B. Carhart, Sec	Sheffield	Sheffield	C. Triplett	Sep'tr	Test	185
	Greene County									
358	Adaza	Adaza Co-op. Cr'y Co	Co-op	M. M. Reeding, Sec	Adaza	Adaza	W. S. Fey	Sep'tr	Test	703
359	Farlin	Farlin Co-op. Cr'y Co	Co-op.	J. M. Trollver	Farlin	Farlin	A. J. Davis	Sep'tr	Test	344

360	Paton..........	Paton Creamery........	Ind...	George E. White....	Paton........	Paton..........	B. M. Lamb.....	Sep'tr..	Test..	377
361	Grand Junc....	Renner's Creamery....	Ind...	Renner Bros.........	Grand Junc....	Grand Junc....	C. L. Renner....	Sep'tr..	Test..	118
362	Rippey.........	Rippey................	Ind...	Richardson & Remington	Ruthven, Palo Alto Co.	Rippey.........	E. Tuttle......	Sep'tr..	Test..	234
363	Scranton.......	Scranton Creamery.....	Stk Co	I. H. Adams, Sec...	Scranton.......	Scranton.......	I. H. Adams.....	Sep'tr..	Test..	183
	Grundy County.									
364	Ackley, Har. Co	Johnson.................	Ind...	J. N. Johnson.......	Ackley.........	Ackley.........	T. Newman.....	S.& G.O.	Hd....	786
365	Beaman........	Beaman.................	Ind...	P. McNelly..........	Beaman.......	Beaman........	P. McNelly......	S & G.O	....	267
366	Conrad.........	Conrad Creamery.......	Ind...	N. H. Blom..........	Conrad.........	Conrad.........	....	Sep'tr..	Test.	
367	Dairyville......	Dairyville..............	Ind...	Graham Bros........	Dairyville.....	New Hartford.	Proprietor.......	Sep'tr..	Test..	136
368	Fredsville.....	Fredsville Co-op. Co....	Co-op.	Charles Olson, Sec..	Fredsville.....	Cedar Falls....	A. K. Smith.....	Sep'tr..	Test..	266
369	Grundy Center	J. H. Sperry............	Ind...	J. H. Sperry.........	Grundy Center	Grundy Center	Louis Cedar.....	Sep'tr..	Test.	
370	Grundy Center	J. H. Sperry............	Ind...	J. H. Sperry.........	Grundy Center	Grundy Center	George Norton..	Sep'tr..	Test..	336
371	Holland........	Colfax Creamery........	Ind...	J. H. Sperry.........	Grundy Center	Grundy Center	C. Badger........	Sep'tr..	Test.	
372	Ivester.........	Ivester Creamery Co...	Co-op.	Geo. Schwarck, Sec.	Ivester.........	Eldora.........	E. E. Starr......	Sep'tr..	Test..	273
373	Holland........	Colfax Creamery........	Ind...	S. Nilsson...........	Holland.......	Holland........	Ed. Wright......	Sep'tr..	Test.	
374	Holland........	Holland Creamery......	Ind...	J. H. Sperry.........	Grundy Center	Holland........	....	Sep'tr..	Test..	367
375	Morrison.......	Lincoln Spring..........	Ind...	Patrick & Campbell.	Lincoln	Morrison.......	G. H. Patrick...	Sep'tr..	Test..	652
376	Morrison.......	Morrison Creamery.....	Ind...	H P. Jacobson & Bro	Morrison.......	Morrison.......	J. P. Jacobson..	Sep'tr..	Test.	
377	New Hartford.	Fairfield Twp. Cr'y.....	Ind...	Graham Bros........	New Hartford	New Hartford.	George Graham.	Sep'tr..	Test.	
378	*Reinbeck.....	Reinbeck Cheese Fact'y	Stk Co	Fowler Co...........	Waterloo, Bl'k Hawk Co	Reinbeck......	G. A. Place......	Sep'tr..	Test.	
379	Wellsburg......	Wellsburg..............	Ind...	Martin & Faust......	Wellsburg.....	Wellsburg.....	....	Sep'tr..	Hd.	
	Guthrie County.									
380	Adair, Ada'r Co	East Exira Creamery...	Ind...	F. F. Wilcox.........	Exira....	Exira..........	J. P. Nielson....	Sep'tr..	Test.	
381	Guthrie Center	Guthrie Center Cr'y....	Ind...	Andrew Wood.......	Guthrie Cent'r	Guthrie Cent'r	A. Wood.........	Sep'tr..	Hd.	
382	*Guthrie Center..*	*Wichita.................*	*Ind....*	*Andrew Wood........*	*Guthrie Center..*	....	....	*Sep'tr..*	*Hd.*	
383	Stuart..........	Stuart Creamery.......	Ind...	E. M. Lamos.........	Stuart..........	Stuart..........	E. E. Gates.....	Sep'tr..	Test.	

CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by an individual, co-operative or stock comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Guthrie County.									
384	*Stuart*	*Arbor Hill*	*Ind.*	*E. M. Lamos*	*Stuart*			*Sep'tr.*	*Test.*	
385	Yale	Yale Creamery	Ind.	Park & Son	Yale	Yale	O. D. Barthlew	Sep'tr	Test	1,003
	Hamilton County									
386	Ellsworth	Ellsworth Co-op C'y A'n	Co-op.	John Thorsen, Pres.	Ellsworth	Ellsworth	K. T. Naa	Sep'tr	Test	283
387	Kamrar	Gold Nugget	Ind.	D. G. Bailey	Kamrar	Kamrar	D. G. Bailey	Sep'tr	Test	85
388	Poplar Grove	Poplar Grove	Ind.	Geo. G. Howard	Poplar Grove	Webster City	Geo G. Howard	Sep'tr	Hd.	
389	Radcliffe, Hardin Co	Lincoln Creamery Co.	Co-op	Martin Christian, P.	Radcliffe, Hardin Co	Radcliffe	Peter Larson	Sep'tr	Test	46
390	Randall	Randall Farmers' C'y	Co-op.	Jens Clausen, Sec.	Randall	Randall	H. N. Miller	Sep'tr	Test	9
391	Stanhope	Stanhope Creamery	Ind.	N. C. Blow	Stanhope	Stanhope	N. C. Blow	Sep'tr	Test	247
	Hancock County.									
392	Britt	Crystal Creamery Co	Co-op.	Ed Peterson, Sec.	Britt	Britt	L. C. Peterson	Sep'tr	Test	90
393	Britt	Britt	Ind.	L. S. Potter	Corwith	Britt	F. Crofe	S.& G.C.	Test.	
394	Corwith	Corwith	Ind.	L. S. Potter	Corwith	Corwith	A. H. Adams	S.& G.C.	Test.	
395	*Corwith*	*Kubley*	*Ind.*	*L. S. Potter*	*Corwith*			*S. & G.C*	*Test.*	
396	*Corwith*	*Stallenna*	*Ind.*	*L. S. Potter*	*Corwith*			*S. & G.C.*	*Test.*	
397	*Corwith*	*Harrisgrove*	*Ind.*	*L. S. Potter*	*Corwith*			*S. & G.C.*	*Test.*	
398	Garner	Garner	Stk Co	S. S. Whitney	Forest C'y, Winnebago Co.	Garner	W. L. Channer	S.& G.C.	Test.	
399	*Crystal Lake*	*Northern Iowa Cr'y Co*	*Stk Co*	*S. E. Allen, Pres*	*Forest C'y, Winnebago Co.*			*S. & G.C.*	*Test.*	
400	*Ellington*	*Northern Iowa Cr'y Co*	*Stk Co*	*S. E. Allen, Pres*	*Forest C'y, Winnebago Co.*			*S. & G.C.*	*Test.*	

401	*German Valley.*	*Northern Iowa Cr'y Co..*	*Stk Co*	*S. E. Allen, Pres......*	*Forest C'y, Win-* [*nebago Co.*	....	....	*S. & G.C.*	*Test.*	
402	Klemme	Klemme Creamery Co..	Co-op.	L. Sampson, Sec.....	Klemme........	Klemme	W. L. Palmer...	G. C.		
403	Madison	Madison Creamery Co..	Co-op.	C. B. Hanner, Sec...	ForestC'y, Win- [nebago Co.	Forest City....	Lewis Richards	Sep'tr ..	Test.	749
Hardin County.										
404	Alden....	Alden Co-op Cr'y Co ...	Co-op.	R. L. Bolitho, Sec...	Alden	Alden..........	Robt.Rishworth	Sep'tr ..	Test	
405	Alden	Buckeye	Ind ...	Carl Clausing........	Alden	Alden..........	Carl Clausing...	Sep'tr ..	Test	107
406	Eldora.........	Hughes	Ind ...	M. E. Hanson........	Hughes	Hughes	M. E. Hanson...	Sep'tr ..	Test.	216
407	Iowa Falls.....	Siloam Springs Cr'y.....	Ind ...	M. I. Powers.........	Iowa Falls.....	Iowa Falls.....	....	Sep'tr.	Test..	864
408	Lawn Hill.....	Lawn Hill...............	Ind ...	Geo B. Strayer.....	Lawn Hill.....	Lawn Hill......	Geo. B. Strayer.	G. C.....	....	51
409	Radcliffe.......	Concord& S.Co-opC'yCo	Co-op	T. L. Thompson.....	Radcliffe.......	Radcliffe.......	A. Berven......	Sep'tr ..	Test..	880
410	Robertson	Robertson...............	Ind ...	J. Windecker & Sons	Robertson	Robertson	S. O. Windecker	Sep'tr ..	Hd.	
411	Union..........	Union Creamery Co.....	Co-op.	Thos. E. Culp, Sec ..	Union	Union	Thos. E. Culp...	Sep'tr ..	Test..	280
412	Whitten.......	Whitten Creamery Co..	Co-op.	Geo. N. Carr, Sec....	Whitten	Whitten........	George N. Carr..	G. C.		
Harrison County.										
413	Little Sioux....	Little Sioux Creamery..	Co-op.	W. F. Arthur, Sec...	Little Sioux....	River Sioux....	F. T. Ryon.	Sep'tr ..	Hd.	
414	Magnolia.......	Magnolia Creamery Co.	Co-op.	Henry Cadwell, Sec.	Magnolia.......	Logan..	R. A. McHale...	Sep'tr ..	Test.	
Henry County										
415	Wayland.......	Hickory Grove F'rm'rs' [Dairy Ass'n.	Co-op.	C. H. Kyes, Sec.. ...	Merrimac, Jef- [ferson Co.	Wayland	David Rich......	Sep'tr ..	Test..	52
416	Winfield........	Winfield Creamery......	Ind ...	Eicher Bros..........	Winfield........	Winfield........	J. A. Eicher.....	Sep'tr ..	Test..	991.
Howard County.										
417	Chester	Chester Co-op. Cr'y Co.	Co-op.	E. O. Green..........	Chester	Chester	E. D. Capper....	G. C.		
418	Cresco..........	Cresco Creamery........	Ind ...	W. B. Owens.........	Cresco..........	Cresco..........	....	S & G.C.	Test..	663
419	Elma	Elma Creamery.........	Stk Co	Carter & Dunn......	Elma	Elma	....	S.& G.C.	Test..	772
420	Lime Springs..	Ice Cave Creamery Co..	Stk Co	Ice Cave Cr'y Co...	Decorah, Win- [neshiek Co.	Lime Springs..	A. Gulbronson..	S.& G.C.	Test..	165
421	Protivin.......	Protivin Cream'y Ass'n	Co-op.	J. J. Lukes, Sec	Protivin	Cresco..........	W. J. Kadbe.....	G. C.....	....	739
422	Saratoga.......	Saratoga Co-op. C'y As'n	Co-op.	W. H.Taubman, Sec.	Saratoga.......	Chester	G. J. Hoopman..	G. C.		

CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by an individual, co-operative or stock comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Humboldt County.									
423	Bode	Bode Creamery Ass'n	Co-op.	T. O. Hanson, Sec.	Bode	Bode	H.O.Granseth,Jr	Sep'tr	Test	254
424	Bradgate	Bradgate Creamery	Co-op.	J. L. Van Horn	Bradgate	Bradgate	E. M. Vargason	Sep'tr	Test	691
425	Humboldt	Humboldt B. & C. Ass'n	Co-op.	G.L.Cruikshank,Sec	Humboldt	Humboldt	J. C. Hall	Sep'tr	Test	50
426	Livermore	Livermore	Stk Co	L. S. Potter	Corwith	Livermore	E. Underwood	S.& G.C.	Test.	
427	Ottosen	Wacousta Cr'y Ass'n	Co-op.	Louis J. Clave	Ottosen	Ottosen	L. Hoppestead	Sep'tr	Test	878
428	Renwick	Renwick	Ind	W. T. Drennen & Son	Renwick	Renwick	S. P. Drennen	S.& G.C.	Test	263
429	Thor	Clover Creamery	Stk Co	Lewis Olson, Sec.	Thor	Thor	L. J. Tokheim	Sep'tr	Test	152
	Ida County.									
430	Arthur	Arthur Creamery	Ind	Robert Clayton	Arthur	Arthur	Robt. Clayton	Sep'tr	Test.	
431	Battle Creek	Maple Valley Creamery	Ind	Nelson & Jourgens'n	Battle Creek	Battle Creek	A. Crawford	G. C.		
432	Galva	Galva	Ind	Robert Jorgensen	Galva	Galva	Robt. Jorgensen	Sep'tr	Hd.	
433	Holstein	Holstein Creamery	Ind	Perpritz & Bischel	Holstein	Holstein	—. Perpritz	Sep'tr	Hd.	
434	Ida Grove	Ida Grove Creamery	Ind	Alfred D. Saunders.	Ida Grove	Ida Grove	A. D. Saunders	Sep'tr	Hd.	
	Iowa County.									
435	Genoa Bluff	Genoa Bluff	Ind	Geo. R. Howard	Genoa Bluff	Marengo	C. E. Stanfield	G. C.	....	181
436	North English.	North English	Ind	Magoon & O'Brien	North English.	North English	Dick O'Brien	G. C.		
437	South Amana	Clover Creamery	Ind	D. Sanderfield	South Amana.	Homestead	D. Sanderfield	G. C.	....	838
438	Victor	Victor	Ind	A. L. Minehart, Mgr.	Victor	Victor	A. L. Minehart	G. C.		
439	Williamsburg	Williamsburg	Ind	J. M. Matthews	Williamsburg	Williamsburg	J. M. Matthews.	G. C.		

	Jackson County.								
440	Andrew	Andrew Lily Creamery.	Ind	C. R. Bell	Andrew	Maquoketa	Bert Ayers	S. & G.C.	Test.	
441	*Baldwin, No. 27*	*Diamond Creamery Co*	*Ind.*	*Simps'n, McIntrie&Co*	*Boston, Mass*			*Sep'tr*	*Test.*	
442	Bellevue	Rose Valley Cr'y Co	Co-op.	N. C. Bisdorf	Bellevue	Bellevue	F. H. Entringer.	G. C.		
443	Bernard, Dubuque Co.	Austin	Co-op	David Stanton	Cascade	Bernard	Chas. Hunter	Sep'tr	Test.	
444	Emeline	Brandon Co-op. Cr'y Co.	Co-op.	N. H. Loven, Sec	Emeline	Maquoketa	N. H. Loven	Sep'tr	Test.	
445	Fulton	Fulton Co-op. Cry. Co.	Co-op.	S. D. Heide, Sec	Fulton	Maquoketa	F. D. Finch	Sept'r	Test.	736
446	La Motte	La Motte Creamery	Ind	Nemmers & Butler	La Motte	La Motte	Peter Butler	S. & G.C.	Test.	806
447	*La Motte*	*St. Danatus*	*Ind.*	*Nemmers & Butler*	*La Motte*			*S. & G.C.*	*Test.*	
448	La Motte	Sterling Separator	Ind	Hoffman & Kettler	La Motte	La Motte	M. J. Hoffman	S. & G.C.	Test.	71
449	*La Motte*	*Sterling Separator*	*Ind.*	*Hoffman & Kettler*	*La Motte*			*S. & G.C.*	*Test.*	
450	Miles	Pioneer Creamery	Stk Co	C. W. Heyner	Miles	Miles	George Sizer	G. C.		98
451	Monmouth	MonmouthCo-op.Cr'yCo	Co-op.	Geo. Sokol, Sec	Monmouth	Monmouth	O. H. Mowers	Sep'tr	Test.	124
452	Preston	Preston	Ind	John Newman Co	Elgin, Ill	Preston	A. J. Negus	Sep'tr	Test.	781
453	*Union Center*	*Union Center*	*Ind.*	*John Newman Co*	*Elgin, Ill*			*Sep'tr*	*Test.*	796
454	Spragueville	Spragueville	Ind	A. Von Oven	Miles	Preston		S.& G.C.	Test	321
455	Spragueville	Spragueville	Ind	John Newman Co	Elgin, Ill		E. R. Dunkam	Sep'tr	Test.	
456	Springbrook	Springbrook Creamery.	Ind	C. M. Kegler	Springbrook	Bellevue	Joseph Bly	G. C.		
	Jasper County								
457	Baxter	Baxter Dairy Co	Co-op.	H. Krampe, Jr., Sec.	Baxter	Baxter	Ralph Itskin	Sep'tr	Test.	745
458	Baxter	Baxter	Ind	Harris & Co	Jesup, Buchanan Co.	Baxter	G. F. Harris	Sep'tr	Test.	146
459	*Baxter*	*Horn*	*Ind.*	*Harris & Co*	*Jesup, Buchanan Co.*			*Sep'tr*	*Test.*	
460	Ira	Ira Creamery	Ind	Harris & Co	Jesup, Buchanan Co.	Ira	C. Stevenson	Sep'tr	Test.	298
461	Kellogg	Kellogg Creamery	Ind	Quaintance& Beatty	Jasper	Kellogg	J. O. Quamtance	G. C.		
462	Monroe	Monroe	Ind	Chase & Stoops	Monroe	Monroe	E. L. Girodat	Sep'tr	Test.	
463	Newton	Malaka Creamery	Ind	N. D. Parsons	Newton	Newton	A. R. Hale	S.& G.C.	Test.	326

CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by an individual, co-operative or stock comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Jasper County.									
464	Prairie City...	Prairie City Creamery..	Ind...	G. W. Cooper........	Prairie City...	Prairie City...	G. W. Cooper....	G. C.		
465	Reasoner......	Palo Alto Dairy Co......	Stk Co	W. E. Caldwell, Mgr	Reasoner......	Reasoner.......	F. E. Bean.......	Sep'tr..	Test..	783
466	Valeria........	F'rs Co op. Cr'y Ass'n..	Co-op.	J. M. Ingle, Sec......	Valeria........	Valeria........	H. W. Patterson.	Sep'tr..	Test.	
	Jefferson County.									
467	Batavia.......	Batavia Creamery Co..	Ind...	J. Kumbolt & Sons..	Salina..........	Batavia.......	Frank Kumbolt	S.& G.C.	Test.	
468	Fairfield.......	Fairfield.................	Ind...	John McLane........	Fairfield........	Fairfield.......	John McLane...	Sep'tr..	Test..	689
469	Four Corners..	Kaufman Creamery....	Ind...	A. M. Kauffman.....	Four Corners..	Lockridge.....	W. C. Smith.....	Sep'tr..	Test..	881
470	Germanville...	Germanville Cr'y Ass'n	Co-op.	J. F. Craff, Manager	Germanville...	Brighton.....	J. H. Johnson...	Sep'tr..	Test..	153
471	Lockridge.....	Lockridge..............	Ind...	Edward Hartmar....	Lockridge....	Lockridge.....	Edw. Hartmar..	Sep'tr..	Test.	882
472	Packwood.....	Packwood Creamery....	Ind...	J. D. Esher..........	Packwood....	Packwood.....	Paul Hines......	Sep'tr..	Test..	992
473	Salina.........	Salina Creamery Co....	Co-op.	J. H. Allender, Sec..	Salina..........	Beckwith......	Henry Goers....	Sep'tr..	Test..	116
	Johnson County.									
474	North Liberty.	North Liberty Cr'my...	Ind...	J. W. Andele.........	North Liberty.	Iowa City.....	....	S.& G.C.	Test..	82
475	*North Liberty..*	*Green Castle............*	*Ind....*	*J. W. Andele.........*	*North Liberty..*	....	....	*S.& G.C.*	*Test.*	
476	Oasis...........	Oasis Creamery Co......	Ind...	V. D. Bumgardner, [Sec.	Oasis...........	Oasis..........	H. Gaymon....	S.& G.C.	Test..	698
477	Oxford.........	Oxford Creamery Co....	Ind...	J. A. Bell............	Oxford., ...	Oxford.........	J. A. Belle.....	G. C.		
478	Solon...........	Cedar Co-op. Cr'y Ass'n	Co-op.	Jos. Krob, Sec.....	Solon...........	Solon.........	J. J. Fiala.......	Sep'tr..	Test.	
479	Solon...........	Solon Creamery.........	Ind...	Fisher & Beck.......	Solon.........	Solon......	D. C. Sigmund..	G. C.		

	Jones County.									
480	Amber	Amber	Ind	W. H. Sanford	Amber	Amber	Jas. Cleveland	Sep'tr	Test	85
481	Amber	Haz'l Green Co-op. Cr. Co	Co-op.	T. I. Platner, Sec	Amber	Amber	A E. Porter	Sep'tr	Test	790
482	Amber	Jackson	Ind	W. H. Sanford	Amber	Amber	J. W. Evans	Sep'tr	Test	83
483	Anamosa	Fawn Creek	Ind	J. S. Condit	Anamosa	Anamosa	P. Wilkison	Sep'tr	Test	237
484	Anamosa	Franklin.	Ind	Vinton Smith	Anamosa	Anamosa	Vinton Smith	Sep'tr	Test	295
485	Cass Center	Center Creamery	Ind	Thomas & Muzzly	Cass Center	Anamosa	Tobias Swanson	Sep'tr	Test.	
486	Cascade, Du- [buque Co.	Temple Hill Co-op Cr. Co	Co-op	M. E. Carr, Pres	Cascade	Cascade	C. Fishtimeir	Sep'tr	Test.	
487	Center Junct'n	Rose Creamery	Ind	C. M. Hanna	Scotch Grove	Scotch Grove		Sep'tr	Test	707
488	Hale	Enterprise Co-op	Co-op.	H. S. Bowman, Sec	Hale	Hale	W. H. Brownell	Sep'tr	Test	125
489	Longworthy	Clover Leaf Cr'my Co	Co-op.				S. N. Glass	Sep'tr	Test	307
490	Monticello	Diamond Creamery Co	Ind	Simpson, McIntire & [Co.	Boston, Mass	Monticello	G.L.Phetteplase	Sep'tr	Test	223
491	*Montic'lo No 2 D*	*Diamond Creamery Co*	*Ind*	*Simpson, McIntire & [Co.*	*Boston, Mass*			*Sep'tr*	*Test.*	
492	*Longworthy No. [2 G*	*Diamond Creamery Co*	*Ind*	*Simpson, McIntire & [Co*	*Boston, Mass*			*Sep'tr*	*Test.*	
493	*Longw'thy No. 4.*	*Diamond Creamery Co*	*Ind*	*Simpson, McIntire & [Co.*	*Boston, Mass*			*Sep'tr*	*Test.*	
494	*Pratr'sbrg No. 5*	*Diamond Creamery Co*	*Ind*	*Simpson, McIntire & [Co.*	*Boston, Mass*			*Sep'tr*	*Test.*	
495	*Monticello No. 6*	*Diamond Creamery Co*	*Ind*	*Simpson, McIntire & [Co*	*Boston, Mass*			*Sep'tr*	*Test.*	
496	*Montic'lo No. 10*	*Diamond Creamery Co*	*Ind*	*Simpson, McIntire & [Co.*	*Boston, Mass*			*Sep'tr*	*Test.*	
497	*Wyoming No. 18*	*Diamond Creamery Co*	*Ind*	*Simpson, McIntire & [Co.*	*Boston, Mass*			*Sep'tr*	*Test.*	
498	*Oxf'd J'ct No. 20*	*Diamond Creamery Co*	*Ind*	*Simpson, McIntire & [Co*	*Boston, Mass*			*Sep'tr*	*Test.*	
499	Martelle	Martelle	Ind	James Sinclair	Martelle	Martelle	Jas. Sinclair	Sep'tr	Test	221
500	*Martelle*	*Brookside*	*Ind*	*James Sinclair*	*Martelle*			*Sep'tr*	*Test*	222
501	Monticello	Downerville C-op. Cr. Co	Co-op.	Wm. Lande	Monticello	Monticello	F. G. Parking	Sep'tr	Test	792
502	Monticello	Star Co-op. Cr'my Co	Co-op.	Geo. Ambuhl, Sec	Bowen	Monticello	O.W. Brazelton	Sep'tr	Test	679
503	Olin	Levesen Creamery	Ind	Condit & Swanson	Anamosa	Olin		Sep'tr	Test	781
504	Olin	Olin Creamery	Ind	Condit & Swanson	Anamosa	Olin	C. L. Passmore	Sep'tr	Test	158

CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by an individual, co-operative or stock comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Jones County.									
505	Onslow........	Coral Creamery	Ind...	J. L. Bader..........	Clayford.	Onslow.........	J. L. Bader......	Sep'tr..	Test..	97
506	Onslow........	Clay Valley Co-op.Cr.As	Co-op.	C. L. Butler, Sec....	Onslow.........	Onslow.........	F. A. Corrier....	Sep'tr..	Test.	
507	Scotch Grove..	Rose Creamery..........	Ind...	C. M. Hanna, Sec....	Scotch Grove..	Scotch Grove..	....	Sep'tr..	Test..	656
508	Wyoming......	Wyoming Co-op.Cr'y As.	Co-op.	J. W. Rhodes, Sec...	Wyoming......	Wyoming......	Isaac H. Smith.	Sep'tr..	Test.	
	Keokuk County.									
509	Delta....... ..	Delta Creamery.........	Ind...	James Dickson......	Delta..........	Delta..........	H. S. Wood......	Sep'tr..	Hd....	24
510	Hedrick........	Hedrick Creamery......	Ind...	C. Hines..............	Hedrick........	Hedrick........	E. S. Barnes.....	Sep'tr..	Test..	616
511	Keswick.......	Keswick Creamery.....	Ind...	C. W. Wilson, Sec...	Keswick.......	Keswick.......	C. W. Wilson....	G. C.		
512	What Cheer...	What Cheer Creamery.	Ind...	Emery & Frink....	What Cheer....	What Cheer....	F. L. Emery....	S. & G C.	Test.	
513	*What Cheer.....*	*Barnes City.............*	*Ind...*	*Emery & Frink......*	*What Cheer....*	....	....	*Sr & G.C.*	*Test.*	
	Kossuth County.									
514	Algona.........	Algona Co-op. Cr'y Co..	Co-op.	M. Schenk, Sec.....	Algona.........	Algona.........	A.W. Sturgbeck.	Sep'tr..	Test..	236
515	Bancroft.......	Bancroft Co-op. Cr'y....	Co-op.	W. W. Wolcorn, Sec.	Bancroft.......	Bancroft......	Aug. Johnson.	Sep'tr..	Test.	
516	Bancroft.......	Seneca Co-op. Cr'y Co..	Co-op.	M. Jensen, Sec.......	Bancroft.......	Bancroit.......	Leo. Tibbets....	Sep'tr..	Test.	
517	Buffalo Fork..	Buffalo F'k Co-op.Cr. Co	Co-op.	J. P. Stow, Sec......	Buffalo Fork..	Burt...........	F. Vavrichek...	Sep'tr..	Test..	638
518	Burt...........	Burt Co-op. Cr'y Co.....	Co-op.	Geo. A. Angus, Sec..	Burt...........	Burt...........	D. L. Driver.....	Sep'tr..	Test..	697
519	Burt...........	Fenton Co-op. Cr'y Co..	Co-op.	G. W. Newel, Sec....	Fenton.........	Burt...........	H. W. Pettibone.	Sep'tr..	Test..	348
520	Burt...........	Lone Rock Creamery...	Co-op.	John Bernhard, Sec.	Lone Rock.....	Burt...........	L. C. Adams.....	Sep'tr..	Test..	128
521	Germania......	Germania...............	Ind...	J. Morck, Manager..	Germania......	Germania......	Josoa Morck....	Sep'tr..	Test.	

522	German Valley	GermanVal.Co-op.Cr.Co	Co-op.	P. E. Johnson, Sec..	German Valley	Bancroft	E. Bacon........	Sep'tr ..	Test.	
523	Hobart.........	Hobart Co-op. Cr'y Co..	Co-op.	A. Gilmour, Sec.....	Hobart.........	Hobart.........	Aug. Nurell.....	Sep'tr ..	Test. .	300
524	Irvington......	Irvington Co-op. Cr Co	Co-op.	S. R. Roney, Sec.....	Irvington......	Irvington... ..	M. P. Bordwell..	Sep'tr ..	Test..	289
525	Ledyard	Farmers' Co-op. Cr. As .	Co-op.	Chas. G. Lewis......	Ledyard........	Ledyard........	E. K. Junkins...	Sep'tr ..	Test.	
526	Lotts Creek...	Lotts Cr'k Co-op. Cr. Co.	Co-op.	F. L. Ramey, Sec....	Lotts Creek....	Burt	Fred Holeman..	Sep'tr ..	Test. .	241
527	Sexton....	Sexton Co-op. Cr'y Co...	Co-op.	E. A. E. Looy, Sec...	Sexton	Sexton..........	Frank O. Bucon.	Sep'tr ..	Test.	
528	St. Joseph	St. Joseph Dairy Ass'n..	Co-op.	Frank Peysen, Sec..	St. Joseph......	Livermore.....	M. H. Halfen....	Sep'tr ..	Test.	
529	Swea City......	Swea City Co-op. Cr. Co.	Co-op.	John E. Peterson...	Kossuth.... ...	Kossuth........	J. A. Cronholm.	Sep'tr ..	Test..	280
530	Wesley.........	Wesley Co-op. Cr'y.....	Co-op.	Nels Johnson........	Wesley.........	Wesley	....	Sep'tr ..	Test..	302
531	West Bend. ...	Garfield Creamery Co...	Co-op.	R. Berninghoff, Sec.	West Bend.....	West Bend.....	J. L. Reid........	Sep'tr ..	Test. .	268
532	Whittemore....	WhittemoreCo-op.Cr.Co	Co-op.	Thos. Carmody, Sec.	Whittemore ...	Whittemore....	R. C. Scheudal..	Sep'tr ..	Test. .	137
	Lee County.									
533	Ft. Madison ...	Ft. Madison Creamery..	Ind ...	T. G. Currier.........	Ft. Madison ...	Ft. Madison ...	Ray Currier.....	Sep'tr ..	Hd.	
534	*West Point ...	West Point C. & C. Fac'y	Ind ...	Pogge & Stolze.....	West Point....	West Point....	Henry Pogge....	G. C.		
	Linn County.									
535	Alburnett.....	Alburnett..............	Stk Co	J. M. Robins, Sec....	Robins.........	Alburnett.....	R. E. Gould	Sep'tr ..	Test..	657
536	Center Point..	Center Point Creamery.	Ind ...	G. L. Weeks	Center Point..	Center Point..	....	Sep'tr ..	Test.	
537	Central City...	Central City...........	Ind ...	Henderson& Nietert	Central City...	Central City...	John Nietert....	Sep'tr ..	Test..	53
538	Central City...	Valley Farm	Ind ...	P. G. Henderson ...	Central City...	Central City...	St. Elmo Wright	Sep'tr ..	Test..	4
539	Coggon	Coggon Creamery.......	Stk Co	M. L. Ware, Sec.....	Coggon...... ..	Coggon.........	F.J.Crusenbe'ry	Sep'tr ..	Hd.	
540	Coggon	Deep Spring............	Ind ...	Henderson& Bowser	Coggon....... .	Coggon........	J. B. Bowser....	Sep'tr ..	Test.	
541	Coggon	Nickle Plate Co-op. [Co. Cr'y	Co-op.	M. F. LeClair, Mgr..	Prairieburg....	Coggon......	James Church..	Sep'tr ..	Test..	351
542	Coggon	North Side Creamery...	Co-op.	C. J. Johnson, Sec...	Coggon.........	Coggon.........	Fred Lehman...	Sep'tr ..	Hd.	684
543	Elmont	Elmont Creamery	Ind ...	S. B. Mills	Elmont.........	Central City...	S. B. Mills.......	Sep'tr ..	Hd.	
544	Ely	Ely and Western Cr'y..	Stk Co	J. C. Dvorak.........	Ely	Ely........	L. J. Ford	Sep'tr ..	Test..	364
545	*Ely*	*Ely and Western Cr'y....*	*Stk Co*	*J. C. Dvorak, Sec.....*	*Ely*............	....	....	*Sep'tr...*	*Test.*	

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	Linn County.									
546	Fairfax	Scotch Grove Creamery	Ind	Henderson & Babc'k	Fairfax	Cedar Rapids	A. J. Babcock	Sep'tr	Hd.	
547	Lafayette	Lafayette Creamery Co.	Co-op.	D. W. Neighbor, Sec.	Lafayette	Alburnett	H. S. Loveland	Sep'tr	Test.	
548	Lisbon	W. S. Furnas Cr'y Co.	Ind	W. H. Runkle, Sec.	Lisbon	Lisbon	Clyde Hoover	G. C.		
549	Marion	W. W. Gray Cr'y Co.	Ind	W. W. Gray Cr'y Co.	Marion	Marion	C. A. Cline	Sep'tr	Test	765
550	*Bertrand*	*W. W. Gray Creamery Co.*	*Ind*	*W. W. Gray Cr'y Co.*	*Marion*			*Sep'tr.*	*Test.*	
551	*Prairieburg, No. 3.*	*Diamond Creamery Co.*	*Ind*	*Simpson, McIntire & Co.*	*Boston, Mass*			*Sep'tr.*	*Test.*	
552	Prairieburg	Oak Leaf Creamery	Ind	Minehart & Cook	Prairieburg	Prairieburg	L. E. Minehart	Sep'tr	Hd.	768
553	Robins	Eureka	Ind	J. M. Robins	Robins	Robins	R. E. Gould	Sep'tr	Test.	
554	Springville	Phoenix	Ind	Irwin Paul	Springville	Springville	Irwin Paul	Sep'tr	Test	381
555	*Springville*	*Linn Grove*	*Ind*	*Irwin Paul*	*Springville*			*Sep'tr.*	*Test.*	
556	Toddville	Monroe	Ind	J. Johnson	Toddville	Toddville	C. Lissnes	Sep'tr	Test	210
557	Troy Mills	Troy Mills	Ind	Gard & Ondler	Troy Mills	Walker	John Ondler	Sep'tr	Hd.	
558	Troy Mills	Highland Creamery Co.	Co-op.	W. Horak, Sec	Walker	Walker	Thomas Nietert	Sep'tr	Hd.	
559	Walker	Walker	Ind	H. J. Nietert	Walker	Walker	S. W. Laird	Sep'tr	Test	18
560	Waubeek	Burlington Cr'y Co.	Co-op.	F. J. Richards, Sec.	Anamosa	Central City	W. W. Ross	Sep'tr	Test.	
561	Waubeek	Crown	Ind	J. G. Fox	Waubeek	Central City	H. C. Hemenway	Sep'tr	Hd.	
562	Waubeek	Waubeek	Ind	A. L. Corey	Waubeek	Viola	A. L. Corey	Sep'tr	Hd	

	Louisa County									
563	Fredonia	Fredonia	Ind	Thomas Carey	Fredonia	Fredonia	E. W. Kelly	G. C.		
564	Letts	Letts Creamery	Ind	J. M. Hilderbrand	Letts	Letts	J.M.Hilde'brand	G. C.		
565	Wapello	Wapello	Ind	T. Dreitdough	Wapello	Wapello	T. Dreitdough	G. C.		
	Lucas County.									
566	*Derby*	*Derby*	*Ind*	*H. S. Snyder, Mgr*	*Humeston, Wayne Co*			*Sep'tr*	*Test*	
567	Russell	Russell Creamery Co	Co-op.	W. J. Marshall, Sec.	Russell	Russell	W. J. Marshall	Sep'tr	Test	81
	Lyon County.									
568	Inwood	Inwood	Stk Co	G. M. Anderson	Inwood	Inwood	Alex. Nordmark	Sep'tr	Test	636
569	Larchwood	Larchwood Creamery	Ind	E. O. Wright	Larchwood	Larchwood	E. O. Wright	Sep'tr	Hd.	
570	Lester	Lester Co-op. Cr'y Co	Co-op	J. McCarthy	Lester	Lester	J. McCarthy	Sep'tr	Test.	
	Madison County.									
571	East Peru	Farmers' Creamery	Co-op	E. M. Lamos	Stuart	East Peru	Bert Sheer	Sep'tr	Test.	
572	Macksburg	Cook Creamery Co	Ind	E. M. Lamos	Stuart	Lorimor	W. Way	Sep'tr	Test	87
573	Patterson	Patterson	Ind	Chas. H. Smith	Patterson	Patterson	Chas. H. Smith	Sep'tr	Test	617
574	Pitzer	Jackson Creamery Co	Ind	E. M. Lamos	Stuart	Stuart	A. Rcchran	Sep'tr	Test.	
575	Winterset	Cloverdale	Ind	Joseph Henry	Winterset	Winterset	A. M. Choate	G. C.		
	Mahaska County.									
576	New Sharon	New Sharon	Stk Co	F. E. Crawford	New Sharon	New Sharon		G. C.		
577	Union Mills	Union Mills B. Co	Ind	James H. Allen	Union Mills	New Sharon	Willis Fry	Sep'tr	Test.	
	Marion County.									
578	Durham	F'rm'rs' B. & C. Mfg. Co. Ass'n.	Stk Co	C. H. Durham, Sec.	Durham	Durham	Fred Larwood	Sep'tr	Test.	
579	Gosport	Gosport Co-op. B. and C	Co-op.	D. F. Gheist, Sec	Gosport	Knoxville	P. B. Gavit	Sep'tr	Test	673
580	Knoxville	Knoxville	Ind	J. J. Bousquet	Pella	Knoxville	W. H. Liter	G. C.		
581	Pella	Garden City	Ind	J. J. Bousquet	Pella	Pella	A. J. Rhynsburger.	G. C.		
	Marshall County.									
582	Clemons	Mineral Valley Cr'y Co.	Co-op.	Jno. Van Meter, Sec.	Clemons	Clemons	Henry Nolta	G. C.		
583	Haverhill	Columbia Creamery Co.	Co-op	Albert Imholt	Haverhill	Haverhill	George Marcus	Sep'tr	Test	258
584	Haverhill	Haverhill Creamery	Ind	Mayer Bros	Haverhill	Haverhill	George Mayer	G. C.		

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	Marshall County.									
585	Le Grand	Le Grand B and C. As'n	Ind ...	J. K. Moody..........	Le Grand	Le Grand	John R. Moody.	Sep'tr ..	Test ..	778
586	*Liscomb	Liscomb B. and C. Co...	Stk Co	C. F. Biersborn, Sec.	Liscomb........	Liscomb........	C. F. Biersborn.	Sep'tr ..	Test ..	206
587	Melbourne.....	Farmers' Co-op. Cr'y....	Co-op.	E.L.Poffenberger,Sc	Melbourne.....	Melbourne.....	Frank J. Mable.	Sep'tr ..	Test ..	741
588	Rhodes.........	Eden	Ind ...	Anthony Rhodes	Rhodes	Rhodes.........	C. A. Weeks.....	G. C.		
589	State Center...	State Center Farmers' [Cr'y Ass'n.	Co-op	E. G. Swift...........	State Center..	State Center...	H. R. Norris.....	G. C.....	....	16
	Mills County.									
590	Emerson	Blue Grass Creamery...	Ind ...	W. M. Tolander......	Emerson	Emerson	W. M. Tolander.	G. C.		
591	Glenwood	Golden Hill Dairy......	Ind ..	W. M. Mickelwait...	Glenwood	Glenwood......	W.M.Mickelwait	Sep'tr ..	Test.	
592	Malvern........	Malvern Creamery.. ..	Ind ...	J. P. Norton..	Malvern........	Malvern........	....	G. C.		
	Mitchell County.									
593	Bailey.........	Lawn Spring	Co-op	T. J. Wheeler, Pres.	Bailey	Bailey	M. M. Blandin...	G. C.		
594	Little Cedar...	Little Cedar Cr'y Co....	Co-op.	Edward Hill, Sec'y..	Little Cedar...	Little Cedar ...	Chas. B. French	G. C.		
595	McIntire.......	Ice Cave Cr'y Co........	Stk Co	Ice Cave Cr'y Co....	McIntire.......	McIntire......	Knute Hoage...	Sep'tr ..	Test.	
596	Meroa	Rock CreekCo-op.CyAn	Co-op.	S J. Fosholdt, Sec'y	Meroa..........	Osage...........	L. McLaren.....	G. C.....	....	786
597	Orchard	Farmers' Co-op. Ass'n.	Co-op.	W. R. Turner........	Orchard.......	Orchard	Van Fanbrother	G. C.		
598	Osage	Farmers' Co-op. C'yA'n	Co-op.	M. Hunt, Secretary.	New Haven....	Osage...........	T. Trim..........	G. C.		
599	Osage	Osage Co-op. Cr'y Co....	Co-op	Albert Bartle, Sec'y	Osage	Osage...........	D. McDugall....	G. C.		
600	Riceville.......	Riceville Co-op. C'yA'n	Co-op.	F. J. Carpenter, S'y.	Riceville.......	Riceville.......	George Miller...	G. C.		
601	Saint Ansgar..	Farmers' Co-op. Cr'y....	Co-op.	T. M. Tollefson, S'y.	St. Ansgar.....	St. Ansgar	M. G. Dysthe....	G. C.		

602	Stacyville......	Stacyville Creamery...	Ind...	F. C. J. Oxtoly......	Stacyville	Little Cedar...	Thomas Oxtoly.	Sep'tr ..	Test.	
	Monona County.									
603	Blencoe........	Blencoe.................	Ind...	Geo. Brunker........	Blencoe........	Blencoe........	Peter Beck......	Sep'tr ..	Hd.	
	Montgomery County.									
604	Elliott.........	Elliott B'r & Cheese Co.	Stk Co	H. G. Barnes, Sec'y.	Elliott..........	Elliott..........	J. H. Baldwin...	Sep'tr ..	Test..	119
605	Stanton	Stanton Creamery......	Ind...	Elgin Creamery Co	Chicago, Ill....	Stanton........	....	Sep'tr ..	Test.	
	Muscatine County.									
606	Atalissa........	Penn Avenue Creamery	Ind...	Jacob Long..........	Atalissa.......	Atalissa........	J. I. Star	S.& G.C.	Hd....	657
607	West Liberty..	Cedar Valley...........	Ind...	S. B. Pickering......	West Liberty..	West Liberty..	Wm. Mathew....	S.& G.C.	Hd.	
608	*West Liberty...*	*Centerdale..............*	*Ind....*	*S. B. Pickering......*	*West Liberty...*	....	....	*S.& G.C.*	*Hd.*	
609	West Liberty..	H. H. Hildebrand......	Ind...	H. H. Hildebrand....	West Liberty..	West Liberty..	E.B. Hildebrand	G. C.		
610	Wilton Junct'n	Nickle Plate............	Ind..	Geo. W. Kelly........	Wilton Junct'n	Wilton..........	C. E. Kelly......	S.& G.C.	Hd....	989
611	*Wilton Junct'n.*	*Moscow.................*	*Ind....*	*Geo. W. Kelley........*	*Wilton Junct'n.*	....	....	*S & G.C.*	*Hd.*	
	O'Brien County.									
612	Paullina.......	Caledonia...............	Ind...	Wm. Gehels, Sec...	Germantown..	Paullina	Wm. Gehels.....	Sep'tr ..	Hd....	29
613	Sutherland....	Sutherland	Ind...	Adams Bros.........	Sutherland ...	Sutherland	R. H. Tinkham..	Sep'tr ..	Test..	67
	Osceola County									
614	Melvin.	Sanborn	Ind...	Geo. Wells, Sec......	Sanborn	Sanborn	George Wells ...	Sep'tr ..	Test..	92
615	Ocheydan......	Farmers' Co-op. B. & C. [Factory.	Ind...	F. J. Fousck.........	Ocheyedan	Ocheyedan	H.E. Richardson	S.& G C.	Test.	
	Page County.									
616	Blanchard....	Blanchard B. & C. Co...	Stk Co	E. L. Kennon, Sec...	Blanchard.....	Blanchard.....	J. J. Thompson..	Sep'tr ..	Hd.	
617	Clarinda.......	Clarinda	Ind...	Chiles Bros.........	Clarinda	Clarinda	S. P. Chiles	G. C.		
618	Shambaugh....	Shambaugh Creamery..	Stk Co	R A. Hawthorne, Sec	Shambaugh....	Shambaugh....	R.A. Hawthorne	Sep'tr ..	Test..	777
	Palo Alto County.									
619	Ayrshire.......	Silver Creek Cr'y Co....	Co-op.	P. O. Hond, Sec	Ayrshire.......	Ayrshire.......	J. A. Blakeman.	Sep'tr ..	Test..	283
620	Crippen........	Crippen..................	Co-op.	S. P. Fredericksen...	Crippen........	Crippen........	W. G. Sterzbach.	Sep'tr ..	Test..	332
621	Curlew.........	Curlew Creamery Co ...	Co-op.	Geo. W. Downs, Sec.	Curlew.........	Curlew.........	C.P.Christensen	Sep'tr ..	Test..	178
622	Cylinder	Cylinder B. & C. Ass'n..	Co-op.	J. M. Tyler, Pres....	Cylinder.......	Cylinder.......	L. M. Cleveland.	Sep'tr ..	Test..	252
623	Depew..........	Maple Leaf Cr'y Co.....	Co-op.	A. Leishman, Sec ...	Depew.....	Cylinder.......	S. B. Moltz......	Sep'tr ..	Test..	519

CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by an individual, co-operative or stock comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Palo Alto County.									
624	Emmetsburg	Emmetsburg Cr'y Co	Co-op.	Lewis Steuhmer, Sec	Emmetsburg	Emmetsburg	N. Knutson	Sep'tr	Test	994
625	Emmetsburg	Nevada Creamery Co	Co-op.	—— Hildus	Mallard	Emmetsburg		Sep'tr	Test.	
626	Fairville	Fairville Creamery Co.	Co-op.	C. H. Bleckwenn, Sec	Fairville	Whittemore	Albert Kressin.	Sep'tr	Test	369
627	Graettinger	Graettinger Cr'y Co	Ind	A. K. Fahnestock, Sec	Graettinger	Graettinger	John Brüek	Sep'tr	Test	658
628	Graettinger	Lost Island Cr'y Co	Co-op.	Lars C. Christenson, [Sec	Graettinger	Graettinger	M. C. Peterson	Sep'tr	Test.	
629	Mallard	Mallard B. & C. Ass'n	Co-op	Theo. Reinders, Sec.	Mallard	Mallard	J. W. Finnell	Sep'tr	Test	340
630	Osage	Osage Creamery Co	Co-op.	L. P. Stillman	Osage	Osage	E. W. Reid	Sep'tr	Test	37
631	Rodman	Rodman Co-op. Cr'y Co	Co-op	C. J. Frye, Sec	Rodman	Rodman	Jesse Keid	Sep'tr	Test	746
632	Ruthven	Highland Butter Ass'n.	Co-op.	T. J. Breman, Sec	Ruthven	Ruthven	W. H. Haller	Sep'tr	Test.	
633	Ruthven	Ruthven Creamery	Ind	H. D. Remington	Ruthven	Ruthven	E. J. Remington	Sep'tr	Test	223
634	Ruthven	Trumbull Lake	Ind	H. D. Remington	Ruthven	Ruthven	A. L. Remington	Sep'tr	Test	742
635	West Bend	West Bend Co-op. C'y Co	Co-op.	L. E. Temple, Sec	West Bend	West Bend	Thomas Clark	Sep'tr	Test	365
	Plymouth County.									
636	Akron	Akron & Sioux Valley [Cr'y Co	Co-op.	C. F. Horton, Sec	Akron	Akron	G. Chenowerth	Sep'tr	Test	780
637	Ellendale	Ellendale	Co-op.	J. F. Gorman, Sec	Ellendale	Merrill	Wm. Anderson	Sep'tr	Test.	
638	Le Mars	Le Mars Co-op. Cr'y Co.	Co-op.	Thos. Langel, Sec	Le Mars	Le Mars	J. C. Burbridge.	Sep'tr	Test	753
639	Le Mars	Grant Township Cr'y Co	Co-op	H. F. Maust, Sec	Struble	Dalton	E. W. Geyer	Sep'tr	Test.	
640	Merrill	Merrill Creamery Co	Co-op.	R. M. Crouch, Sec	Merrill	Merrill	C. B. Horrocks	Sep'tr	Test	655

641	Remsen........	Remsen Co-op. Cr'y Co.	Co-op.	A. Wilberding, Sec..	Remsen........	Remsen........	D. W. Mohen....	Sep'tr..	Hd.	
642	Struble.........	Struble Creamery Co...	Co-op.	F. C. Stoll...........	Struble........	Struble........	R. Thorkelson..	Sep'tr..	Test.	
	Pocahontas County.									
643	Fonda..........	Rosebud................	Ind...	R. F. Beswick.	Fonda..........	Fonda..........	....	Sep'tr..	Test..	811
644	Havelock	Havelock Creamery....	Ind...	F. W. Shellman......	Plover..........	Havelock	....	Sep'tr..	Test..	789
645	Laurens........	Laurens Creamery Co..	Ind...	T. J. Beats..........	Laurens........	Laurens........	T. J. Beats......	Sep'tr..	Test.	
646	Plover..........	Plover Creamery........	Ind...	F. W. Shellman, Mgr	Plover..........	Plover..........	F. W. Shellman.	Sep'tr..	Test..	788
647	Rolfe...........	Gilt Edge........	Ind...	W. R. Rogers.......	Rolfe...........	Rolfe...........	W. R. Rogers....	Sep'tr..	Test..	329
	Polk County.									
648	Bondurant.....	F'rs Co-op. C'ry Ass'n..	Co-op.	B. T. Rothrock, Sec.	Bondurant.....	Bondurant.....	Alex Gabrielson	Sep'tr..	Test.	
649	Grimes..........	Grimes But. & Ch. Co...	Stk Co	L. W. Briggs.........	Grimes.........	Grimes	G. A. Stewart....	Sep'tr..	Test..	229
650	Maxwell........	Keystone	Ind...	Frank W. Hill.......	Maxwell........	Maxwell	F. S. Whirry.....	S. & G..	....	285
651	Mitchellville..	Mitchellville Cr'y Ass'n	Co-op.	Wm. Prichards, Sec.	Mitchellville...	Mitchellville...	Geo. E. Roller...	Sep'tr..	Hd....	186
652	Polk City.	Tip-Top Butter Co......	Stk Co	John McLean, Pres.	Polk City	Polk City......	J. L. Wilson.....	Sep'tr..	Test..	19
653	Runnells.......	Runnells................	Co-op.	L. C. West, Sec......	Runnells.......	Runnells	H. L. Case......	Sep'tr..	Test..	377
	Pottawattamie County.									
654	Avoca..........	Avoca Creamery........	Ind...	R. Frost.............	Avoca..........	Avoca..........	M. A. Sorensen..	G. C.		
655	Hancock..	Silver Valley...........	Ind...	H. C. Brandes.......	Hancock.......	Hancock.......	Chas Pemberton	Sep'tr..	Hd....	261
656	Macedonia	Macedonia Cr'y Co......	Stk Co	C. H. McCready, Sec.	Macedonia	Macedonia	S. M. Geyer......	Sep'tr..	Test.	
657	Minden.........	Minden Creamery.......	Co-op	Wm. Spears, Pres....	Neola	Minden.........	N. P. Jorgensen.	Sep'tr..	Test..	686
658	Treynor........	Treynor Creamery Co..	Co-op	Fred Holst..........	Treynor........	Council Bluffs.	F. C. Winchell..	Sep'tr..	Test.	
	Poweshiek County									
659	Brooklyn	Brooklyn Creamery....	Ind...	C. B. Galloway, Sec.	Brooklyn.......	Brooklyn	CarlB.Galloway	G. C.		
660	Deep River....	Deep River.............	Ind...	H. M. Hatter.........	Deep River.....	Deep River....	E. A. Smith......	G. C.		
661	Grinnell........	Fowler Creamery.......	Ind...	J. W. Fowler.........	Grinnell........	Grinnell	J. W. Fowler....	Sep'tr..	Test..	197
662	Guernsey.......	Rose Farm Creamery...	Ind...	J. W. Rose	Guernsey	Guernsey.......	J. W. Rose.......	G. C.		
663	Hartwick......	Hartwick Creamery Co.	Ind...	Isaac Hakeman.....	Hartwick......	Hartwick.......	J. C. Emery.....	G. C.		

CREAMERY LIST—CONTINUED.

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	Poweshiek County.									
664	Jacob..........	Jacob Creamery........	Ind...	A. C. Payne..........	Jacob.	Jacob Switch..	....	Sep'tr ..	Test.	
	Ringgold County									
665	Kellerton......	Kellerton Creamery....	Ind...	J. D. Campbell......	Kellerton......	Kellerton......	....	Sep'tr ..	Test.	
666	*Knowlton*.......	*Knowlton*................	*Ind* ...	*O. Sands, Pres*........	*56 Fifth Av., Chicago, Ill.*	....	....	*Sep'tr* ..	*Test.*	
667	Redding........	Redding Creamery.....	Stk Co	D. M. Rich, Sec	Redding.......	Redding........	D. M. Rich	G. C.		
	Sac County.									
668	Auburn	Auburn Creamery......	Ind...	Boardman Bros.&Co	Nevada	Auburn	Walter Bennett.	Sep'tr ..	Hd....	121
669	Carnarvon	Carnarvon Creamery...	Ind...	Boardman Bros.&Co	Nevada	Carnarvon.....	S. C. McCoy.....	Sep'tr ..	Hd....	122
670	Carnarvon	Carnarvon Creamery...	Ind...	W. A. Sraman	Carnarvon	Carnarvon	W. A. Sraman...	Sep'tr ..	Hd.	
671	Early..........	DelawareCenterCr'yCo.	Co-op.	Clark N. Searle, Sec.	Early..........	Early..........	A. I Grotland...	Sep'tr ..	Test..	13
672	Early..........	Early Creamery.........	Ind...	George W. Pattee...	Early..........	Early..........	Geo. W. Pattee..	Sep'tr ..	Test..	337
673	Early..........	Gold Medal.............	Ind...	J. W. Wright.........	Early..........	Early..........	J. W. Wright....	Sep'tr ..	Test..	191
674	Lake View.....	Lake View..............	Ind...	Donahue & Ahern...	Lake View.....	Lake View.....	Jeff Hoon........	Sep'tr ..	Test..	249
675	Odebolt........	Farmers Creamery Co..	Stk Co	J. A. Cranston, Sec..	Odebolt	Odebolt........	Wm. Kline.... ..	Sep'tr ..	Test..	683
676	Odebolt........	Rose Valley............	Ind...	G. Fuhlendorf.......	Odebolt	Odebolt........	M. S. Trautman	Sep'tr ..	Test..	265
677	*Sac City.......	Blue Grass B. & C. F'ty.	Ind...	I. Hillman..........	Sac City.......	Sac City........	Fred Hillman...	Sep'tr ..	Test.	
678	Sac City........	Coon Valley Creamery.	Ind...	Elwood & Pettis.....	Sac City.......	Sac City........	W. H. Pettis.....	Sep,tr ..	Test.	
679	Sac City........	Pearl Creamery.........	Ind...	H. H. Underhill.....	Sac City.......	Sac City........	Chas. M. Culp...	Sep'tr ..	Test..	287
680	Schaller........	Eureka.................	Ind...	C. F. Schroeder......	Schaller...	Schaller........	....	Sep'tr ..	Hd....	331

681	Wall Lake.....	Wall Lake...............	Ind...	Donahue & Ahern..	Wall Lake.....	Wall Lake.....	T. Ahern.........	Sep'tr..	Test..	711
	Scott County.									
682	Davenport.....	Donahue F'rs But. Co..	Stk Co	F. Keppy, Sec.......	Donahue.......	Donahue.......	....	Sep'tr..	Hd.	
683	Eldridge........	Farmers Co-op. Cr'y....	Ind...	W. J. Bryson........	Eldridge.......	Eldridge........	....	Sep'tr..	Test..	276
684	Long Grove....	Star Creamery..........	Ind...	G. W. Curtis.........	Long Grove....	Long Grove....	G. W. Curtis.....	G. C.		
	Shelby County									
685	Elkhorn........	Danish Centrif'l Cr'y Co	Ind...	Geo. James, Sec.....	Elkhorn........	Brayton........	P. K. Peterson..	Sep'tr..	Test.	
686	Harlan.........	Harlan Creamery.......	Ind...	C. E. Juergensen...	Harlan.........	Harlan.........	C. E. Jeurgensen	G. C.		
687	Harlan.........	Buck Valley Creamery.	Co-op.	R. Rasmussen, Sec..	Harlan.........	Kirkman	M.P. Henricksen	Sep'tr..	Test..	751
688	Walnut, Pottawattamie Co	Prairie Rose..	Co-op.	Staus Lencsh.......	Walnut	Walnut	N. C. Madsen....	Sep'tr..	Hd.	
	Sioux County.									
689	Alton..........	Alton Co-op. Cr'y.......	Co-op.	J. P. Fritz, Sec......	Alton..........	Alton..........	G'st've Kruempl	Sep'tr..	Test..	704
690	Granville......	Northwestern Cr'y Co..	Stk Co	John Eulberg, Mgr..	Granville	Granville......	Fred Koppe.....	Sep'tr..	Hd.	
691	Hospers........	Hospers Creamery Co..	Co-op.	J. J. De Boor, Sec....	Hospers........	Hospers........	F. W. Johnson..	Sep'tr..	Test.	
692	Hawarden......	Hawarden Cr'y Ass'n ..	Co-op.	J. M. Lynn, Sec......	Hawarden	Hawarden......	G. A. Crowther..	Sep'tr..	Test..	129
693	Hull......	Hull Creamery..........	Ind...	L. E. Bourquin......	Hull...........	Hull...	L. E. Bourquin..	Sep'tr..	Hd....	324
694	Rock Valley...	Rock Valley............	Ind...	John Cronin.........	Rock Valley...	Rock Valley...	G. Kottman.....	Sep'tr..	Test..	757
695	Sioux Center..	Welcome Cr'y Co.......	Co-op.	T. Prins, Sec	Sioux Center..	Sioux Center..	Wm. Edes.......	Sep'tr..	Test..	749
696	Sioux Center..	Sioux Center Cr'y.......	Ind...	G. H. Schoy..........	Sioux Center..	Sioux Center..	A. D. Rozetoom.	Sep'tr..	Test.	987
697	*Sioux Center....*	*Sioux Center Western....*	*Ind....*	*G. H. Schoy ....*	*Sioux Center....*	....	....	*Sep'tr...*	*Test.*	
	Story County.									
698	Ames	Iowa Agricul. Col. Cr'y	....	State of Iowa........	Ames..........	Ames..........	G. L. McCay.....	Sep'tr..	Test..	304
699	Ames	Milford F'm'rs' Cr'y Co.	Co-op.	W. J. Gilmore........	Ames..........	Ames..........	W. M. Young....	Sep'tr..	Test..	366
700	Cambridge.....	Spring Valley Cream'ry	Ind...	B. F. Erb............	Cambridge.....	Cambridge.....	B. J. Talbert....	Sep'tr..	Test..	308
701	*Cambridge......*	*Spring Valley Creamery.*	*Ind....*	*B. F. Erb............*	*Cambridge......*	....	....	*Sep'tr...*	*Test.*	
702	Collins.........	F'rmers' Co-op. Cr'y Co.	Co-op.	E. W. Shear, Pres ..	Collins.	Collins..........	J. N. Bossnot....	Sep'tr..	Test..	629
703	Colo...........	Fairview.................	Ind...	L. M. Kelley........	Colo......... ..	Colo	....	Sep'tr..	Test..	614

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704	*Story County.* Gilbert Station	Gilbert Station Cr'y	Ind	Thomas B. Jones	Gilbert Station	Gilbert Station	Peter Jenson	Sep'tr	Test	1,000
705	Iowa Center	Iowa Center	Ind	J. Q. Moore	Iowa Center	Maxwell	M. Mortensen	Sep'tr	Test	212
706	Maxwell	Maxwell	Ind	Frank W. Hill	Maxwell	Maxwell		S & G.C.	Test	288
707	McCallsburg	McCallsburg B.& C.Fac.	Ind	F. Schawper, Pres	McCallsburg	McCallsburg	O. O. Snyder	Sep'tr	Test	240
708	Roland	Indian Hill Cr'y Co	Co-op.	R. Kimble, Pres	Roland	Roland	R. Binton	Sep'tr	Test	681
709	Roland	Farmers' Cr'y Co	Co-op.	E. J. Evenson, Sec	Roland	Roland	J. F. Burrets	Sep'tr	Test	48
710	Roland	Roland Creamery	Ind	Boardm'n Bros.& Co.	Nevada	Roland	N. C. Johnson	Sep'tr	Test	120
711	Story City	Story City F'm'rs Cr'y	Co-op.	L. R. Larson	Story City	Story City	W. H. Scheiber	Sep'tr	Test	720
712	*Tama County.* Dinsdale	Dinsdale Co-op. Cr'y Co.	Co-op.			Dinsdale		Sep'tr	Test.	
713	Dysart	Dysart	Stk Co	Rowes Bros	Vinton	Dysart		G. C.		
714	Elberon	Elberon Creamery	Ind	John Skroble	Elberon	Elberon	E. P. Skroble	G. C.		
715	Garwin	Garwin	Stk Co	H. J. Stevens	Garwin	Garwin	E. F. Johnson	G. C.		
716	Montour	Montour Creamery	Ind	J. M. Lawyer	Montour	Montour	J. M. Lawyer	G. C.		
717	Traer	Traer	Ind	J. B. O'Conner	Traer	Traer	J. B. O'Conner	S & G.C.	Test.	
718	*Taylor County* *Blockton	Blockton B. & C. Ass'n.	Ind	Fred Longwell	Blockton	Blockton	Fred Longwell	S.& G.C.	Hd.	
719	Clearfield	Clearfield Cr'y Co	Stk Co	D. H. Porter, Sec	Clearfield	Clearfield	S. B. Huyck	Sep'tr	Test	699
720	*Conway*	*Elgin Creamery Co*	*Ind*	*Elgin Creamery Co*	*Conway*			*Sep'tr*	*Test.*	

721	Lenox	Lenox Creamery Co	Ind	Elgin Creamery Co.	Lenox	Lenox	A. M. Snyder	Sep'tr	Test	661
722	Guss	Cold Spring Creamery	Co-op	H. B Moat	Guss	Corning	A. C. Morse	Sep'tr	Hd	69
723	*Guss	Maple Grove	Ind	I. Schoonover, Mgr.	Guss	Nodaway	E. Schoonover	Sep'tr.	Hd.	
	Union County									
724	Afton	Afton	Ind	O. Sands, Pres	Chicago, Ill	Afton	G. W. Kelley	Sep'tr	Test	771
725	*Afton*	*Lincoln*	*Ind*	*O. Sands, Pres*	*Chicago, Ill*			*Sep'tr*	*Test.*	
726	*Afton*	*Dodge*	*Ind*	*O. Sands, Pres*	*Chicago, Ill*			*Sep'tr*	*Test.*	
727	*Afton*	*Pleasant*	*Ind*	*O. Sands, Pres*	*Chicago, Ill*			*Sep'tr*	*Test.*	
728	Arispee	Farmers' Co-op. Cr'y	Co-op.	A. C. Gross	Arispee	Arispee	Fred Farwell	Sep'tr	Test	996
729	Creston	Creston	Ind	O. Sands	Chicago, Ill	Creston	R. T. McColl	Sep'tr	Test	723
730	*Cromwell*	*Cromwell*	*Ind*	*Elgin Creamery Co*	*Chicago, Ill*			Sep'tr	Test.	
731	Lorimor	Lorimor	Ind	O. Sands, Pres	Chicago, Ill	Lorimor	Geo. Beckman	Sep'tr	Test	687
732	Talmage	Talmage Co-op.Cr'y Co.	Co-op.	J. W. Beebe, Sec	Talmage	Talmage	J. W. Alexander	Sep'tr	Test	852
733	*Talmage*	*Gripp*	*Co-op.*	*J. W. Beebe, Sec*	*Talmage*			*Sep'tr*	*Test.*	
	Van Buren County.									
734	Farmington	Farmington Cr'y Co	Ind	H. G. Kelley, Pres	Farmington	Farmington		S. & G.C.		
735	*Stockport*	*Fairfield Creamery*	*Ind*	*Jno. M. Lane*	*Fairfield, Jefferson Co.*			*Sep'tr*	*Test.*	
	Wapello County.									
736	Agency	Agency B. & C. Co	Co-op	John Engert, Sec	Agency	Agency	C. E Perkins	Sep'tr	Test.	
737	Blakesburg	Blakesburg Cr'y	Ind	Nelson & Walters	Blakesburg	Blakesburg		Sep'tr	Test.	
738	Dudley	Dudley Cr.& Milling As.	Ind	A. J. Gardner, Pres.	Eddyville	Dudley		Sep'tr	Test.	
739	Kirkville	Kirkville	Ind	Lykins & Myers	Kirkville	Kirkville	U. G. Myers	Sep'tr	Test.	
740	So. Ottumwa	South Ottumwa Cr'y	Ind	E. C. McKimmy	So. Ottumwa	So. Ottumwa	J. G. Myers	Sep'tr	Test	633
	Warren County.									
741	Milo	Warren Co	Ind	E. Haldman	Humeston		C. D. Haldman	Sep'tr	Test.	
742	Norwalk	Norwalk	Co-op.	G. Monow, Sec	Des Moines	Norwalk	Geo. Swartzell	Sep'tr	Test.	
743	Prole	Prole Creamery	Ind	L. Gates, Sec	Prole	Prole		Sep'tr	Test.	

CREAMERY LIST—CONTINUED.

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	Washington County.									
744	Kalona......	Kalona..................	Ind...	M. G Brooke & Son.	Kalona.........	Kalona.........	M. G. Brooke....	G. C.		
745	Keota, Keokuk Co.	Keota Creamery........	Stk Co	S. E. Reisman	Keota, Keokuk Co.	Keota..	W. W. Carpenter	Sep'tr ..	Test ..	106
746	Noble	Oak Ridge..........	Ind...	Lydia Eicher........	Noble	Noble	Joseph Witting.	Sep'tr ..	Test ..	998
747	Riverside......	Riverside................	Ind...	E. Nicola	Riverside......	Riverside.......	Wm. Miles.......	G. C.		
748	Washington ...	Washington Creamery.	Ind...	Hise Bros...........	Washington ...	Washington....	Aug. Viking....	Sep'tr ..	Test ..	876
749	Wellman	Daytonville	Ind...	C. O. Nichols...	Wellman.......	Wellman.......	J. F. Fee.........	Sep'tr ..	Test ..	883
750	Wellman	Deer Creek Mills Dairy Ass'n.	Co-op	S. D. Guengerich, Sec	Amish	Wellman......	L. J. Guengerich	Sept'r ..	Test ..	626
	Wayne County									
751	Allerton........	Allerton Creamery.....	Ind...	I. N. Haldeman......	Allerton..	Allerton........	N. Rassmussen.	Sep'tr ..	Test ..	628
452	Humeston......	Wayne Co. Cr'y Co......	Ind...	H. D. Snyder, Mgr..	Humeston......	Humeston	Fred Taylor....	Sep'tr ..	Test ..	664
753	*Cambria*........	*Wayne Co. Cr'y Co*......	*Ind* ...	*H. D. Snyder, Mgr*...	*Humeston*	....	....	*Sep'tr*...	*Test*...	665
754	*Lewisburg*......	*Wayne Co. Cr'y Co*	*Ind* ...	*H. D. Snyder, Mgr*...	*Humeston*	....	....	*Sep'tr*...	*Test.*	
755	*Leroy*...	*Wayne Co. Cr'y Co*......	*Ind* ...	*H. D Snyder, Mgr*...	*Humeston*	....	....	*Sep'tr*...	*Test* ...	666
756	Seymour	Seymour Creamery.....	Ind...	B. S. Parker, Mgr...	Seymour	Seymour.......	Herbert Brohaw	Sep'tr ..	Hd. ...	727
	Webster County									
757	Badger........	Badger Creamery	Ind...	G. W. Gillman.......	Badger.........	Badger.........	G. W. Gillman..	Sep'tr ..	Test ..	228
758	Callender......	Callender...............	Ind...	—— Bishop...........	Callender......	Callender......	....	S. & G.C.	Test.	
759	Dayton.........	Willow Brook..........	Ind...	J. M. Daniels & Son.	Dayton.........	Dayton	J. M. Daniels....	G. C ..	....	218
760	Gowrie	Gowrie	Ind...	F. S. Davis...........	Gowrie.........	Gowrie.........	Geo. Holtsclaw.	G. C.		

761	Kalo	Payne's Model	Ind	F. R. Payne	Kalo	Fort Dodge	F. R. Payne	Sep'tr	Test	105
762	Moorland	Moorland	Ind	D. J. Skinner	Moorland	Moorland	D. J. Skinner	Sep'tr	Test	182
763	Vincent	Vincent Creamery Co.	Ind	D. C. Miller	Vincent	Vincent	L. Munson	Sep'tr	Test	112
	Winnebago County.									
764	Buffalo Center	Buffalo Center	Stk Co	S. S. Whitney, Sec.	Forest City	Buffalo Center	John Panukuk	Sep'tr	Test.	
765	Dows	Northern Iowa Cr'y Co.	Stk Co	S. E. Allen, Sec.	Forest City		Frank Croft	S. & G.C.	Test.	
766	Forest City	Northern Iowa Cr'y Co.	Stk Co	S. E. Allen, Sec.	Forest City		John Mine	S. & G.C.	Test	731
767	*Amund*	*Northern Iowa Cr'y Co.*	*Stk Co*	*S. S. Whitney, Sec.*	*Forest City*			*Sep'tr*	*Test.*	
768	*Linden*	*Northern Iowa Cr'y Co.*	*Stk Co*	*S. S. Whitney, Sec.*	*Forest City*			*Sep'tr*	*Test.*	
769	*Noden*	*Northern Iowa Cr'y Co.*	*Stk Co*	*S. S. Whitney, Sec.*	*Forest City*			*Sep'tr*	*Test.*	
770	*Lincoln*	*Northern Iowa Cr'y Co.*	*Stk Co*	*S. E. Allen, Sec.*	*Forest City*			*Sep'tr*	*Test*	368
771	*Leland*	*Northern Iowa Cr'y Co.*	*Stk Co*	*S. E. Allen, Sec.*	*Forest City*			*Sep'tr*	*Test.*	
772	Lake Mills	Logan Butter Factory	Co-op.	J. J. Lande, Pres.	Lake Mills	Lake Mills	J. M. Tapager	Sep'tr	Test	269
773	Norman	Norman	Co-op.	S. G. Honsy	Norman	Norman	N.N.Engbretson	Sep'tr	Test	735
774	*Norman*	*Bristol*	*Co-op.*	*S. G. Honsy*	*Norman*			*Sep'tr*	*Test.*	
775	*Norman*	*Moen*	*Co-op.*	*S. G. Honsy*	*Norman*			*Sep'tr*	*Test.*	
776	Lake Mills	Winnebago & Worth Co [Cr'y Ass'n.	Co-op	Ole T. Groe, Pres.	Lake Mills	Lake Mills	Thos. E. Bolton.	S. & G.C	Test	799
777	*Lake Mills*	*Winnebago & Worth Cr'y [Ass'n.*	*Co-op.*	*Ole T. Groe, Pres.*	*Lake Mills*			*S. & G.C.*	*Test.*	
	Winneshiek County.									
778	Burr Oak	Silver Creek Cr'y Co.	Co-op.	M. D. Whitney, Sec.	Burr Oak	Decorah	Clayton A. Reed	G. C.		
779	Calmar	Calmar Creamery	Ind	Boe & Nelson	Calmar	Calmar	Proprietor	G. C.		
780	Castalia	Ice Cave Creamery Co.	Stk Co	Ice Cave Cr'y Co.	Decorah	Castalia		S. & G.C.	Test	163
781	Conover	Crystal Springs	Ind	C. J. Murer	Decorah	Conover	L. Lynne	Sep'tr	Test	624
782	Decorah	Ice Cave Creamery Co.	Stk Co	Ice Cave Cr'y Co.	Decorah	Decorah	Ira Riwa	G. C.		
783	Ft. Atkinson	Ice Cave Creamery Co.	Stk Co	Ice Cave Cr'y Co.	Decorah	Ft. Atkinson	L. H. Lee	Sep'tr	Test	170
784	Frankville	Ice Cave Creamery Co.	Stk Co	Ice Cave C'ry Co.	Decorah	Ossian		S. & G C.	Test.	

CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by an individual, co-operative or stock comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Winneshiek County.									
785	Hesper	Anchor	Ind	J. H. Miller	Hesper	Mable		G. C.		
786	Highlandville.	Kjomerle Spring Cr'y	Ind	N. N. Larson	Highlandville.	Spring Grove	N. N. Larson	G. C.		
787	Kendallville.	Kendallville	Ind	Boe & Nelson	Calmar	Cresco	Ed Holnes	G. C.		
788	Nassett	Ice Cave Creamery Co.	Stk Co	Ice Cave Cr'y Co	Decorah	Decorah	Hans Foss	Sep'tr	Test.	
789	Nordness	Ice Cave Creamery Co.	Stk Co	Ice Cave Cr'y Co	Decorah	Nordness	E. G. Opdahl	G. F.		
790	Nordness	Nordness Cr'y Co	Stk Co	J. J. Running	Nordness	Nordness	Geo. H. Thune	G. C.		
791	Nordness	Red Oak	Co-op	O. G. Haugen, Sec.	Nordness	Nordness	Erik Clement	G. C.		
792	Ossian	Ice Cave Creamery Co.	Stk Co	Ice Cave Cr'y Co	Decorah	Ossian	Iver Iverson	S. & G. C.	Test.	
793	Ossian	Washington Prairie Cr.	Ind	P. O. Nasse	Ossian	Ossian	P. O. Nasse	G. C.		
794	Ossian	Scheidemantle Cr'y	Ind	H. Scheidemantle	Ossian	Ossian	John Hickley	G. C.		159
795	*Eldorado, Fayette Co*	*Scheidemantle Cr'y*	*Ind*	*Henry Scheidemantle*	*Ossian*			G. C.		
796	Ridgeway	Lincoln Fmr's Co op. Cr Ass'n.	Co-op.	James Paley, Sec.	Ridgeway	Ridgeway	O. P. Sjobakkan	G. C.		
797	Ridgeway	Ice Cave Creamery	Stk Co	Ice Cave Cr'y Co	Decorah	Ridgeway	L. T. Fosse	G. C.		
798	Spillville	Spillville Creamery Co.	Ind	J. A. Dostal	Spillville	Conover	J. A. Dostal	G. C.		315
	Worth County									
799	Fertile	Fertile Co-op. Dairy Co.	Co-op.	B. G. Richardson	Fertile	Manly Junct'n	Peter Onverson.	Sep'tr	Test.	
800	Grafton	Grafton Cr'y Ass'n	Co-op.	M. Buchrer	Grafton	Grafton	H. H. Opperman	Sep'tr	Test	728
801	Kensett	Fmr's Co-op. Cr'y Ass'n	Co-op.	O. N. Kjerland	Kensett	Kensett	Peter P. Naig	S & G.C.	Test	198

802	Manley Jct....	Manly Co-op. Creamery.	Co-op.	A. E. Miller..........	Manly..........	Manly Junct'n	Henry Knowles.	G. O....	....	242
803	Nordland......	Nordland Cr'y Ass'n....	Co-op	A. C. Kittlesan, Sec.	Nordland	Kensett........	C. H. Cleveland	Sep'tr ..	Test..	783
804	Northwood.....	Brookfield Cr'y Ass'n..	Co-op.	E. A. Tenold, Sec....	Northwood	Northwood ...	N. C. Siverling..	Sep'tr ..	Test..	758
805	Northwood.....	Hartland Dairy Ass'n..	Co-op.	Osnes Reyerson, Sec	Silver Lake....	Northwood	N. O. Dolen.....	Sep'tr ..	Test..	804
806	Northwood.....	Farmers' B. & C. Ass'n.	Co-op.	L. G. Mellem, Sec...	Northwood	Northwood	J. Siverling.....	Sep'tr ..	Test.	
	Wright County.									
807	Belmond.......	Belmond Iowa Cr'y.....	Ind...	S. S. Whitney, Sec..	Forest City....	Belmond	W. H. Barker...	G. C.		
808	Clarion.........	Clarion..................	Ind...	J. D. Denison........	Clarion.........	Clarion.........	J. D. Denison...	G. C.		
809	Goldfield	Fountain B. & C. Fac...	Ind...	B. P. Scott & Co.....	Goldfield.......	Goldfield	B. P. Scott......	Sep'tr ..	Test.	
810	Rowan	Rowan	Co-op.	J. H. Dix............	Rowan	Rowan	E. V. Campbell.	Sep'tr ..	Test..	688

TABLE No. X.

Creamery list arranged by counties, showing number of creameries and skim stations, how operated; total and average number of patrons and cows, and other information.

COUNTIES.	NUMBER OF CREAMERIES AND SKIM STATIONS, SHOWING NUMBER INDIVIDUAL, CO-OPERATIVE AND STOCK COMPANIES.					NUMBER OPERATED AS SEPARATOR, GATHERED CREAM, OR BOTH				TOTAL NUMBER RECEIVING MILK BY THE TEST OR CWT.			NUMBER PATRONS FURNISHING MILK AND CREAM, NUMBER COWS PRODUCING MILK AND CREAM DELIVERED TO CREAMERIES, WITH AVERAGE NUMBER TO EACH CREAMERY AND CREAMERY PATRON.							NUMERICAL CONDITION OF DAIRY HERDS AS COMPARED WITH LAST YEAR.				NUMBER CREAMERIES AND SKIM STATIONS BUILT OR REMODELED FOR YEAR ENDING NOVEMBER 1, 1896.				Number creameries burned during the year ending November 1, 1896.
	Total No. of creameries and skim stations.	Number reported.	Individual.	Co-operative.	Stock company.	Number reported.	As separator.	As gathered cream.	As separator and gathered cream.	Number reported.	By test.	By cwt.	Number of creameries	Number reported.	Total number of patrons.	Av. number of patrons per creamery.	Total number of cows.	Average number of cows per creamery.	Average number of cows per patron.	Number reported.	As larger.	As smaller.	Remaining about the same.	Number of creameries	Number remodeled.	Number of skim stations	Total.	
The state	810	809	424	304	81	810	641	95	74	700	573	127	725	568	60 944	108	517 503	919	7	366	203	50	106	69	29	19	117	20
Adair	6	6	6	....	....	6	6	....	...	6	3	3	5	5	610	102	4,870	574	8	5	1	....	....	1	....	...	1	....
Adams	5	5	5	...	...	5	5	...	...	5	5	..	1	....	....	....	....	....	...	....	....	....	....	1	....	1	2	....
Allamakee	13	13	1	6	6	13	3	9	1	2	2	....	13	10	1,823	182	12,003	1,200	7	5	4	1	....	2	....	...	2	....
Appanoose	....	....	.	....	....	....	....	..	....	....	....	....	....	....	....	....	....	....	..	....	....	....	....	...	....	....	....	....
Audubon	5	5	1	4	..	5	5	....	....	5	5	....	5	4	377	94	3,024	756	8	1	1	....	....	1	....	....	1	+1
Benton	11	11	6	4	1	11	9	1	1	10	7	3	9	8	737	92	5,807	726	8	4	1	1	2	...	....	....	....	....
Black Hawk	22	22	3	16	3	22	22	....	....	21	18	3	22	21	1,724	82	18,894	900	11	14	8	2	4	1	3	....	4	+1
Boone	4	4	3	1	...	4	3	1	....	3	3	....	4	3	368	123	1,658	553	4	....	....	....	....	2	....	....	2	+1
Bremer	25	25	5	17	3	25	25	....	....	24	12	12	24	23	1,371	56	16,507	717	12	14	5	....	9	...	1	....	1	1
Buchanan	17	17	9	8	....	17	17	....	....	17	15	2	16	14	1,553	12	17,915	1,279	12	11	3	....	8	2	1	....	3	1
Buena Vista	9	9	7	2	....	9	9	....	...	8	7	1	7	5	438	87	3,410	682	8	4	2	....	2	2	...	....	2	1
Butler	18	18	9	8	1	18	16	1	1	17	9	8	17	16	1,992	125	17,896	1,117	9	13	9	1	3	1	....	....	1	+1
Calhoun	7	7	4	3	....	7	6	1	....	5	3	2	7	6	315	53	2,991	498	10	3	2	1	....	1	1	....	2	....
Carroll	8	8	7	....	1	8	8	...	....	8	2	6	8	4	303	76	2,146	536	7	6	4	....	....	1	1	..	2	....
Cass	5	5	3	2	...	5	3	2	.	3	3	....	2	2	240	120	1,440	720	6	1	1	....	....	....	....	3	3	....
Cedar	6	6	4	1	1	6	2	1	3	5	....	5	5	3	567	189	4,597	1,532	8	2	....	1	1	...	....	....	....	....
Cerro Gordo	10	10	8	2	....	10	7	..	3	9	8	1	10	8	783	98	5,961	745	8	7	3	1	3	...	....	....	....	....
Cherokee	6	6	6	....	....	6	6	....	..	6	....	6	6	3	260	86	1 595	53	6	....	....	....	....	2	....	....	2	....
Chickasaw	19	19	3	15	1	19	18	...	1	17	17	....	19	18	1,906	105	18,864	1,048	10	10	6	1	3	...	...	....	....	....
Clarke	4	4	3	1	....	4	4	....	....	4	4	....	2	0	......	.....	......	.....	....	....	.....	....	....	....	1	2	3	....
Clay	6	6	2	3	1	6	6	....	....	6	6	...	6	5	306	61	3,560	712	12	5	1	1	3	....	1	...	1	...
Clayton	20	20	9	10	1	20	20	...	....	20	20	.....	20	14	1,871	134	10,818	1,201	9	13	8	4	2	7	2	....	9	+1
Clinton	15	15	13	....	2	15	14	...	1	15	12	3	9	7	411	58	3,372	481	8	2	1	....	1	....	1	1	2	+1
Crawford	6	6	6	...	....	6	5	1	....	5	3	2	4	2	80	40	900	450	11	....	....	....	....	....	....	....	....	....

Dallas	6	6	4	2	....	6	3	1	2	5	5	....	6	4	463	116	3,538	884	7	4	4	....	....	....	1	....	1	....
Davis	3	3	3	....	....	3	1	....	2	3	3	....	3	2	300	150	1,500	750	5	1	1	....	....	....	1	....	1	....
Decatur	0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Delaware	27	27	12	13	2	27	27	....	....	27	24	3	25	22	1,397	64	18,896	858	14	18	7	5	6	1	....	....	1	....
Des Moines	0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Dickinson	2	2	2	....	....	2	2	....	....	2	2	....	2	2	132	66	1.689	844	18	2	1	....	1	....	1	....	1	....
Dubuque	26	26	9	17	....	26	25	....	1	26	7	19	26	24	1,429	59	16,218	675	11	12	6	2	4	....	....	....	....	†1
Emmet	5	5	1	4	....	5	5	....	....	5	5	....	4	4	265	66	2,510	627	9	2	1	....	1	....	....	....	....	....
Fayette	24	24	2	18	4	24	22	....	2	24	24	....	22	21	2,507	119	23,512	1,119	9	11	2	4	5	....	....	....	....	....
Floyd	8	8	6	1	1	8	5	1	2	7	7	....	8	7	838	119	7,404	1,057	9	4	2	....	2	....	2	....	2	....
Franklin	9	9	6	3	....	9	5	....	4	9	7	2	9	8	842	105	7,222	902	9	5	4	....	1	....	1	....	1	....
Fremont	0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Greene	6	6	3	2	1	6	6	....	....	6	6	....	6	5	369	74	2,666	533	7	2	2	....	....	....	1	....	1	†1
Grundy	16	16	13	2	1	16	14	....	2	15	13	2	16	10	984	98	10,439	1,044	11	2	2	....	1	1	1	....	2	....
Guthrie	6	6	6	....	....	6	6	....	....	6	4	2	4	3	440	147	2,280	760	5	1	1	....	....	....	1	2	3	....
Hamilton	6	6	3	3	....	6	6	....	....	6	5	1	6	5	564	113	4,935	987	9	4	4	....	1	....	....	....	....	....
Hancock	12	12	5	3	4	12	2	1	9	11	11	....	6	4	268	67	2,157	539	8	3	3	....	....	1	....	2	3	....
Hardin	9	9	5	4	....	9	7	2	....	7	6	1	9	7	781	111	5,010	715	6	3	1	....	2	3	....	....	3	1
Harrison	2	2	2	....	....	2	2	....	....	2	1	1	2	....	....	....	....	....	....	....	....	....	....	2	....	....	2	....
Henry	2	2	1	1	....	2	2	....	....	2	2	....	2	2	153	76	771	385	5	2	1	....	1	....	....	....	....	....
Howard	6	6	1	3	2	6	3	....	3	3	3	....	6	4	886	222	7,536	1,884	8	2	1	1	....	1	....	....	1	1
Humboldt	7	7	1	4	2	7	5	....	2	7	7	....	7	6	385	64	2,770	461	7	3	2	1	....	1	1	....	2	....
Ida	5	5	5	....	....	5	4	1	....	4	1	3	5	4	283	70	2,418	604	8	2	2	....	....	1	....	....	1	....
Iowa	5	5	5	....	....	5	....	5	....	....	....	....	5	4	882	221	6,156	1,539	7	1	1	....	....	....	....	....	....	....
Jackson	17	17	11	5	1	17	8	3	6	14	14	....	13	13	1,176	90	12.530	964	11	8	4	2	2	....	....	....	....	....
Jasper	10	10	7	2	1	10	7	2	1	8	8	....	9	5	481	96	3.607	721	8	2	1	1	....	3	....	....	3	†1
Jefferson	7	7	5	2	....	7	6	....	1	7	7	....	7	4	318	78	3,142	785	10	4	4	....	....	4	....	....	4	....
Johnson	6	6	5	1	....	6	1	2	3	4	4	....	5	3	228	76	1,037	346	4	2	....	2	....	....	....	....	....	....
Jones	29	29	21	8	....	29	28	....	1	29	29	....	20	14	1,835	13	16,222	1,158	9	8	7	....	1	1	....	....	1	....
Keokuk	5	5	5	....	....	5	2	1	2	4	3	1	4	3	675	169	2,925	975	4	....	....	....	....	....	....	....	....	1
Kossuth	19	19	1	18	....	19	19	....	....	19	19	....	19	13	1,021	78	10,848	834	11	8	7	....	1	4	....	....	4	....
Lee	2	2	2	....	....	2	1	1	....	1	....	1	2	1	150	150	750	750	5	....	....	....	....	....	....	....	....	....
Linn	28	28	18	5	5	28	27	1	....	27	17	10	24	19	1,201	63	13.080	688	11	10	3	4	3	....	....	1	1	....
Louisa	3	3	3	....	....	3	....	3	....	....	....	....	3	1	140	140	700	700	5	....	....	....	....	....	....	....	....	....
Lucas	2	2	1	1	....	2	2	....	....	2	2	....	1	1	75	75	600	600	8	1	1	....	....	....	....	....	....	....
Lyon	3	3	1	1	1	3	3	....	....	3	2	1	3	1	60	60	360	360	6	1	1	....	....	2	....	....	2	....
Madison	5	5	4	1	....	5	4	1	....	4	4	....	5	3	326	108	2,488	829	8	3	3	....	....	2	....	....	2	....
Mahaska	2	2	1	....	1	2	1	1	....	1	1	....	2	1	500	500	2.500	2,500	5	....	....	....	....	....	....	....	....	....
Marion	4	4	2	1	1	4	2	2	....	2	2	....	4	2	210	105	650	325	3	....	....	....	....	....	....	....	....	....
Marshall	8	8	3	4	1	8	4	4	....	4	4	....	8	6	1,212	202	6,886	1,148	6	4	4	....	....	1	....	....	1	....
Mills	3	3	3	....	....	3	1	2	....	1	1	....	3	2	800	400	3,500	1.750	4	2	1	....	1	....	....	....	....	....
Mitchell	10	10	1	8	1	10	2	8	....	2	2	....	□10	9	1,956	217	14,247	1,583	7	4	1	2	1	....	....	....	....	....
Monona	1	1	1	....	....	1	1	....	....	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Monroe	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Montgomery	2	2	1	....	1	2	2	....	....	2	2	....	1	1	80	80	800	800	10	1	1	....	....	....	....	....	....	....
Muscatine	6	6	6	....	....	6	....	1	5	5	....	5	4	2	389	194	3,345	1,172	9	2	....	....	2	1	....	....	1	....
O'Brien	2	2	2	....	....	2	2	....	....	2	1	1	2	1	68	68	816	816	12	1	....	....	1	....	....	....	....	†1
Osceola	2	2	2	....	....	2	1	....	1	2	2	....	2	1	29	29	174	174	6	1	....	1	....	....	....	....	....	....
Page	3	3	1	....	2	3	2	1	....	2	1	1	3	2	385	192	1,790	895	5	2	1	....	1	1	....	....	1	....

TABLE No. X—CONTINUED.

COUNTIES	NUMBER OF CREAMERIES AND SKIM STATIONS, SHOWING NUMBER INDIVIDUAL, CO-OPERATIVE AND STOCK COMPANIES.					NUMBER OPERATED AS SEPARATOR, GATHERED CREAM, OR BOTH.				TOTAL NUMBER RECEIVING MILK BY THE TEST OR CWT.			NUMBER PATRONS FURNISHING MILK AND CREAM, NUMBER COWS PRODUCING MILK AND CREAM DELIVERED TO CREAMERIES, WITH AVERAGE NUMBER TO EACH CREAMERY AND CREAMERY PATRON.							NUMERICAL CONDITION OF DAIRY HERDS AS COMPARED WITH LAST YEAR.				NUMBER CREAMERIES AND SKIM STATIONS BUILT OR REMODELED FOR YEAR ENDING NOVEMBER 1, 1896.				Number creameries burned during the year ending November 1, 1896.
	Total No of creameries and skim stations.	Number reported.	Individual.	Co-operative.	Stock company.	Number reported.	As separator.	As gathered cream.	As separator and gathered cream.	Number reported.	By test.	By cwt.	Number of creameries	Number reported.	Total number of patrons.	Av. number of patrons per creamery.	Total number of cows.	Average number of cows per creamery.	Average number of cows per patron.	Number reported.	As larger.	As smaller.	Remaining about the same.	Number of creameries	Number remodeled.	Number of skim stations.	Total.	
Palo Alto	17	17	3	14	....	17	17	....	....	17	17	.. .	17	11	808	73	8,811	801	11	10	7	..	3	2	2	...	4	....
Plymouth	7	7	..	7	....	7	7	....	...	7	6	1	7	6	520	87	3,090	515	6	6	6	....	.....	3	....	....	3	...
Pocahontas	5	5	5	....	....	5	5	....	.	5	5	....	5	4	485	121	3,690	921	7	4	4	...	.....	....	....	....	.....	....
Polk	6	6	1	3	2	6	5	...	1	5	4	1	6	6	552	92	4.390	731	8	5	2	2	1	....	...	....	.....	....
Pottawattamie	5	5	2	2	1	5	4	1	....	4	3	1	5	4	632	158	7,787	1,947	12	4	2	....	2	1	1	....	2	....
Poweshiek	6	6	6	....	....	6	2	4	....	2	2	.....	6	6	611	102	3,828	554	5	5	1	1	3	1	....	..	1	....
Ringgold	3	3	2	...	1	3	2	1	....	2	2	.....	2	1	225	225	675	675	3	1	... .	1	.....	1	...	....	1	...
Sac	14	14	12	1	1	14	14	....	....	14	10	4	14	13	1,527	117	15,500	1,192	10	7	5	1	1	. .	1	....	1	...
Scott	3	3	2	....	1	3	2	1	....	2	1	1	3	1	40	40	320	320	8	1	.....	....	1	..	....	....	.....	....
Shelby	4	4	2	2	....	4	3	1	....	3	2	1	4	2	150	75	1,270	635	8	.....	.....	....	.....	....	....	....	.....	....
Sioux	9	9	4	4	1	9	9	....	...	9	7	2	8	7	665	95	4 670	667	7	6	4	....	2	2	....	....	2	....
Story	14	*13	8	5	....	14	13	....	1	14	14	.....	13	11	1,632	148	14,200	1,291	9	9	5	....	4	....	....	....	.....	†2
Tama	6	6	3	1	2	6	1	4	1	2	2	.....	6	4	778	195	5,796	1,449	7	3	1	....	2	2	....	....	2	2
Taylor	6	6	4	1	1	6	5	....	1	6	3	3	5	4	280	70	2,035	508	7	3	3	....	.....	....	....	....	.....	1
Union	10	10	7	3	....	10	10	...	....	10	10	.....	5	2	141	70	1,128	564	8	2	2	....	.....	1	....	2	3	. ..
Van Buren	2	2	2	..	....	2	1	....	1	1	1	.....	1	....	....	.....	....	.....	....	.....	.....	....	.....	....	...	1	1	....
Wapello	5	5	4	1	....	5	5	....	....	5	5	....	5	1	50	50	600	600	12	.....	.....	....	.....	....	....	....	.....	....
Warren	3	3	2	1	....	3	3	....	....	3	3	.....	3	1	60	60	600	600	10	1	1	....	.....	1	....	....	1	....
Washington	7	7	5	1	1	7	5	2	...	5	5	.....	7	7	1,130	161	6.850	978	6	6	4	....	2	....	2	....	2	....
Wayne	6	6	6	...	....	6	6	....	....	6	5	1	3	2	450	225	3,100	1,550	7	4	4	....	.. ..	....	...	1	1	....
Webster	7	7	7	....	....	7	4	2	1	5	5	.....	7	5	765	153	4.600	920	6	5	3	....	2	....	....	....	.....	....
Winnebago	14	14	....	6	8	14	10	..	4	14	14	.....	6	3	325	108	2,950	716	9	2	1	1	.....	....	1	3	4	....
Winneshiek	21	21	9	3	9	21	3	15	3	6	6	.....	20	15	2,208	147	14,592	969	7	7	2	2	3	1	....	....	1	....
Woodbury	0	....	....	....	....	....	.....	....	....	....	....	....	....	....	....	.....	......	.....	....	.....	.....	....	.....	....	....	....	.....	....
Worth	8	8	....	8	...	8	6	1	1	7	7	.....	8	8	1,166	146	9,046	1,130	8	5	2	3	.....	....	....	....	.....	....
Wright	4	4	3	1	....	4	2	2	...	2	2	.. .	4	2	241	120	1,537	768	6	2	1	....	1	....	....	....	.....	....
Total	810	809	424	304	81	810	641	95	74	700	578	127	725	563	60,044	108	517,503	919	7	366	208	50	106	69	29	19	117	20

NOTE.—*Creamery at experiment station, Ames, not classified under this heading, it being property of state. †Creameries burned and rebuilt, 12.

TABLE No. XI.

Creamery list arranged by counties, showing number of creameries and skim stations, together with value, months operated, persons employed, monthly wages, with total wages paid, for the year ending May 1, 1896.

COUNTIES.	NUMBER, VALUE AND TOTAL VALUE OF CREAMERIES AND SKIM STATIONS.							NUMBER OPERATED ENTIRE YEAR, NO LESS THAN YEAR, AV. NUMBER OF MONTHS.					TOTAL NUMBER OF PERSONS EMPLOYED, AMOUNT PAID BUTTER-MAKERS,* ASSISTANTS, AND FOR COLLECTING MILK AND CREAM, AND TOTAL FOR ALL EMPLOYES, FOR YEAR ENDING MAY 1, 1896.																
	Number creameries	Number reporting.	Value of creameries.	No. skim stations.	Number reporting.	Value of skim stations.	Tot'l value of creameries and skim stations.	Number reporting.	Twelve months	Six months or more.	Less than six months	Average number of months operated.	Number reporting	Butter-makers.	Average wages paid winter months.	Average wages paid summer months.	Av. wages paid butt'r-makers throughout the year.	Total amount paid butter-makers.	No. first assistants.	Amount paid per month to first assistants.	No. second assistants	Amount paid per month to second assistants.	Total amount paid assistants.	Number reporting.	No. employed collecting milk and cream	Number reporting.	Amount paid for collecting milk and cream.	Total number employed.	Total amount paid employes.
State	725	516	2,083,705	5	83	$127,150	$2,210,855	658	560	78	20	10.4	646	646	$41.30	$52.66	$51.8[illegible]	$459,375	354	$27.80	37	$30.05	$99,520	411	2,520	329	$585,820	3,145	$ 1,144,715
Adair	5	5	20 000	1	1	2,500	22,500	5	1	4	0	7.5	6	6	.....	.....	49.13	2,868	3	35.66	1	20.00	803	3	27	3	8,515	37	12.186
Adams	1	1	8,000	4	4	8,000	16,000	5	4	1	0	11.0	1	1	...	.....	50 00	600	4	35 00	..		1,470	1	9	...	.....	4	2,070
Allamakee	13	12	39,975	..	..	....	39,975	10	10	..	..	12.0	11	11	47.50	57.50	52.76	6,420	10	28.70	1	24.00	1,814	9	88	5	21,204	110	29,438
Appanoose	...	...	......	..	..	....	......	..	...	..	..	...	...	...	.....	.....		.....	...	.....	..	...	.....	...	.	...	......	.....	.....
Audubon	5	4	12,000	..	..	....	12,000	4	3	1	..	11.5	4	4	.....	.....	68.08	3,167	3	31.00	..	.....	706	4	30	4	8,360	37	12,233
Benton	9	8	28,500	2	2	4,500	33,000	8	6	2	..	11.0	8	8	32.50	42.50	51.25	4.020	5	28 00	2	24.00	1,726	5	42	5	7,485	57	13,231
Black Hawk	22	1	65,500	..	..	....	65,500	21	21		..	12 0	21	21	45.00	56.66	54.69	13,680	13	25.38	..	.....	3,117	11	68	9	15.878	102	32,675
Boone	4	4	8,700	..	..	....	8,700	3	1	1	1	8 0	3	3	....	....	50.00	1,170	1	27.50	..		1[illegible]0	2	8	1	1,557	12	2,847
Bremer	24	24	63,530	1	1	1,200	64,730	24	24	..	..	12 0	24	24	42.50	47 50	60.60	16,630	6	19.56	1	35.00	1,999	10	13	11	3,720	44	22.349
Buchanan	16	15	51,500	1	1	200	51,700	13	13	..	..	12 0	13	13	.....	...	55.76	8,700	10	28.70	4	24.16	3,743	7	63	6	25,147	80	37,590
Buena Vista	7	6	20 100	2	2	2,000	22,100	5	4	..	1	10 0	6	6	50.00	55.00	49.33	2,430	4	28 75	..	.....	1,290	4	24	...	....	34	3,720
Butler	17	17	42,950	1	1	2,000	44.950	16	16	..	..	12.0	17	17	43 33	54.00	51.98	107.072	8	26.12	3	28.66	3,310	8	38	6	10,973	66	121,355
Calhoun	7	6	11.400	..	..	....	11,400	6	5	1	.	11 0	6	6	35.00	45.00	48 00	3,170	2	27.50	..		270	5	8	4	700	16	4,140
Carroll	8	8	23,700	..	..	....	23.700	6	5	1	..	11.5	7	7	40.00	50.00	49.00	3,480	2	31.50	1	30.00	810	2	14	1	2,100	24	6,390
Cass	2	2	38,000	3	3	6,000	44,000	2	1	1	..	10 5	1	1	...	.....	50.00	600	...	....	..	.....	....	1	9	1	480	7	1,080
Cedar	5	4	10,000	1	1	900	10,900	4	3	1	..	11.0	4	4	40.00	50.00	50.00	2,140	3	35.00	1	30.00	1.240	4	36	3	9,431	44	12,811
Cerro Gordo	10	9	29.500	..	..	....	29.500	8	8	..	..	12.0	9	9	40.00	55.00	49 16	5,2[illegible]0	4	28.75	..	....	1,050	8	48	6	10.623	61	16,923
Cherokee	6	5	11 100	..	..	....	11,100	4	2	1	1	9.0	3	3	.....	.....	51.66	1,410	1	35 00	..	......	420	...	......	...	.....	4	1.830
Chickasaw	19	18	59,700	..	..	....	59,700	18	18			2.0	18	18	50 00	59 16	56.63	12,384	12	25.54	..	.....	3,435	17	119	15	30,005	149	45,824
Clarke	2	2	4,500	2	2	3,600	8,100	2	2	..	..	12.0	2	2	30 00	40.00	75.00	1,310	1	30.00	1	30.00	720	..	.....	...	....	4	2,030
Clay	6	6	14.250	..	..	....	14 250	6	6	..	..	12 0	6	6	37.50	48 00	53.12	3,576	2	22.50	..	....	415	3	16	2	800	27	4,791
Clayton	20	20	65,700	..	..	....	65,700	19	19	.	..	12.0	20	20	58.00	59 60	58.80	13,182	9	27.44	2	31.00	3,138	19	138	14	50,344	169	66.664
Clinton	9	9	24.500	6	6	9.700	34,200	13	11	2	..	11.5	9	9	28.33	53.75	48 00	4,580	4	35.00	..	.....	1,680	6	9	...	....	22	6,260
Crawford	4	4	12,500	2	2	3,500	16,000	4	3	1	..	10.5	3	3	30.00	35.00	50 00	1,490	3	21.66	..	......	740	1	15	1	357	21	2,587
Dallas	6	6	19,500	..	..	....	19,500	6	5	..	1	10.5	6	6	......	...	46.66	3,000	2	25.00	..	......	320	6	33	4	3,036	41	6,356

TABLE No. XI—CONTINUED.

COUNTIES.	NUMBER, VALUE AND TOTAL VALUE OF CREAMERIES AND SKIM STATIONS.							NUMBER OPERATED ENTIRE YEAR, NO. LESS THAN YEAR, AV. NUMBER OF MONTHS.					TOTAL NUMBER OF PERSONS EMPLOYED, AMOUNT PAID BUTTER-MAKERS,* ASSISTANTS, AND FOR COLLECTING MILK AND CREAM, AND TOTAL FOR ALL EMPLOYES, FOR YEAR ENDING MAY 1, 1896.																
	Number creameries.	Number reporting.	Value of creameries.	No. skim stations.	No. reporting.	Value of skim stations.	Tot'l value of creameries and skim stations.	Number reporting.	Twelve months.	Six months or more.	Less than six months.	Average number of months operated.	Number reporting.	Butter-makers.	Average wages paid winter months.	Average wages paid summer months.	Av. wages paid butter-makers throughout the year.	Total amount paid butter-makers.	No. first assistants.	Amount paid per month to first assistants.	No. second assistants.	Amount paid per month to second assistants.	Total amount paid assistants.	Number reporting.	No. employed collecting milk and cream.	Number reporting.	Amount paid for collecting milk and cream.	Total number employed.	Total amount paid employes.
Davis	3	3	7,000	..	..	....	7,000	3	3	..	..	12 0	3	3	....	.....	45.00	1,620	2	23.75	..	......	480	3	13	3	6,674	18	8,774
Decatur	...	...	......	..	..	....	....	...	...	..	..	...	...	...		...	...	....	...	....	..	......	......	...	....	...	....	.....	....
Delaware	25	23	68,400	2	2	4,500	67,900	25	25	..	..	12.0	23	23	35.00	46.66	56.01	15,212	13	24.79	..	......	3,310	16	94	12	17,764	180	36,286
Des Moines	..	...	....	..	..	....	....	...	...	..	..	....	...	...	......	.....		......	...	....	..	......	......	...	....	...	....	.	....
Dickinson	2	2	6,000	..	..	....	6,000	2	...	1	1	6.0	2	2	.....	.....	50.00	600	2	27.50	..	.....	240	2	11	2	2,111	15	2,951
Dubuque	26	25	72,700	..	..	....	72,700	24	22	2	..	11.5	24	24	40.00	49.00	47.80	13,177	5	21.60	..	......	906	12	78	11	18,166	102	32,219
Emmet	4	4	11,000	1	1	600	11,600	4	4	..	..	12 0	4	4	40.00	50.00	48.05	2,270	1	25.00	..	....	75	2	2	1	7	1	2,352
Fayette	22	21	73,900	2	2	4,000	77,900	22	22	..	..	12.0	21	21	30.00	35.00	51.81	15,138	15	30.47	..	......	4,662	18	155	17	49,235	191	69,035
Floyd	8	7	20,500	..	..	....	20 500	7	7	..	..	12.0	7	7	......	....	51.42	4,380	5	23.50	..	......	890	7	45	6	11,392	57	16,602
Franklin	9	9	29,500	..	..	....	29,500	9	7	1	1	10.0	9	9	42.00	57.00	49.38	4,624	5	32 60	..	......	1,173	9	64	8	19,123	78	24,920
Fremont	...	...	....	..	..	....	....	...	..	..	..	...	...	...	....	.....		....	...	....	..	.....	......	...	.....	...	....	.....	....
Greene	6	6	23,400	..	..	....	23,400	6	5	1	..	11.0	6	6	30.00	50.00	47.00	3,090	3	29.33	..	....	404	4	33	8	5,668	42	9,162
Grundy	16	14	46,500	..	..	....	46,500	13	12	1	..	11 5	12	12	...	.....	49.16	7,080	6	31.16	1	18.00	2,022	8	85	5	1,709	104	10,811
Guthrie	4	4	14,800	2	2	2,000	16,800	2	1	1	..	11 0	4	4	45.00	62 50	37 50	1,040	2	32.50	1	25 00	720	1	12	1	4.500	19	6,260
Hamilton	6	6	20,500	..	..	....	20,500	6	6	..	..	11 0	6	6	50.00	65.00	54.00	4,220	5	30.00	..	.....	960	4	26	4	6,626	88	11,906
Hancock	6	6	16,000	6	6	4,800	20,800	8	8	..	..	12.0	6	6	......	.....	48.05	2,990	4	40.00	..	......	1,440	3	5	3	1,498	15	5.928
Hardin	9	9	24,100	..	..	....	24,100	7	5	1	1	10.0	8	8	.....	.....	51.25	3,680	3	27.00	..	......	251	4	18	4	4,445	29	8,376
Harrison	2	2	9,000	..	..	....	9,000	...	..	..	.		2	2	.....	......	57 50	....	1	23.00	..	.....	....	...	....	...	.....	2	....
Henry	2	2	6,000	..	..	....	6.000	2	...	1	..	9 0	2	2	......	......	50.00	9'0	1	30.00	.		240	2	8	2	1,500	11	2,640
Howard	6	6	15,600	..	..	....	15,600	5	5	.	..	12.0	6	6	......	......	58.50	3,232	3	31.11	1	36.00	712	2	23	2	7,885	33	11,849
Humboldt	7	7	23,000	..	..	....	23,000	6	6	..	..	12.0	7	7	45 00	50.00	48.50	3,450	3	31 50	..	......	427	5	20	2	1,803	33	5,180
Ida	5	3	7,500	..	..	....	7,500	4	1	2	1	7.5	4	4	.....	.	50.00	1,500	2	32.50	..	.....	570	1	2	1	682	8	2,702
Iowa	5	5	17,500	..	..	....	17,500	5	4	1	..	11 5	5	5	20.00	50.00	56 25	2,520	2	26.80	1	25.00	725	4	21	4	8,583	29	11,838
Jackson	18	18	32,800	4	4	5,800	38,600	15	11	4	..	11.0	18	18	31 43	59 28	45.33	5,850	6	30.00	..	......	1,920	7	21	7	5,225	40	12,995
Jasper	9	8	21,700	1	1	1,000	22,700	7	7	..	..	12.0	8	8	38 33	46.66	50 00	3,640	...	......	..	......	....	5	19	5	7,750	27	11,420
Jefferson	7	6	18,500	..	..	....	18,500	5	4	..	1	10.0	6	6	52 50	60.00	50.00	3,300	3	28.50	..	.....	572	4	31	4	6,875	40	10,247
Johnson	6	5	12,700	1	1	700	13,400	6	1	5	..	8.0	4	4	53.75		..	1,760	2	26.00	1	15.00	580	2	10	3	4,016	17	6,356
Jones	20	20	82,800	9	9	18 500	101,800	25	25	..	..	12 0	18	18	39.00	57.75	53 07	10,483	16	31.41	1	35 00	5,702	5	63	3	4,049	98	21,178
Keokuk	4	4	9,000	1	1	1,000	10,000	5	5		.	12 0	4	4	40.00	40.00	40.00	2,400	2	30.00	..	......	510	4	31	3	4,000	37	7,510
Kossuth	19	18	58,700	.		....	58,700	17	11	2	4	9.5	17	17	45 00	50 00	56.42	9,105	7	24 28	..	......	2,080	5	5	5	2,800	39	13,485

Lee	2	2	4,000	..	..	....	4,000	2	2	..	..	12.0	1	1	50 00	50.00	50.00	600	..	......	..	......	....	...	.....	...	....	1	600
Linn	24	23	61,550	4	4	6,500	68,050	25	23	2	..	11.5	23	23	34 00	45.00	48.72	12,054	7	29.35	2	22.50	2,404	12	38	7	4,180	69	18,988
Louisa	3	2	1,500	..	..	....	1,500	2	2	..	..	12.0	2	2	15 00	40.00	50.00	930	2	..	..	......	....	2	8	...	1,000	13	1,980
Lucas	1	1	4,000	1	1	2,500	6,500	1	1	..	..	12.0	...	...	......	......	......	......	...	......	..	......	....	...	.....	...	....	.....	....
Lyon	3	3	5,700	..	..	....	5,700	2	...	2	..	9.0	2	2	......	......	55.00	1,000	1	15.00	..	......	45	1	8	1	814	6	1,859
Madison	5	5	15,500	..	..	....	15,500	4	3	1	..	11.0	4	4	......	......	42.91	1,600	3	18 33	.	....	460	4	39	2	1,687	46	3,747
Mahaska	2	2	8,000	..	..	....	8,000	2	2	..	..	12.0	2	2	...	......	37.50	900	1	40.00	1	35.00	690	1	12	1	4,800	16	6,390
Marion	4	2	4,500	..	..	....	4,500	1	1	..	..	12 0	2	2	37 50	50.00	35.00	....	...	......	..	......	....	...	.....	...	....	2	....
Marshall	8	7	21,300	..	..	....	21,300	8	6	2	..	10.5	8	8	37.33	53.33	52.00	4,314	5	26.60	..	......	789	7	46	6	13,080	59	18,083
Mills	3	3	5,500	..	..	....	5,500	3	2	1	..	11.5	2	2	......	......	50.00	1,200	2	27.00	..	......	411	2	15	2	5,150	19	6,761
Mitchell	10	9	16,700	..	..	....	16,700	9	9	..	..	12.0	10	10	40.00	47.50	52.22	6,107	6	26.00	..	......	490	7	32	7	13,974	48	20,571
Monona	1	1	1,600	..	..	....	1,600	1	1	..	..	12.0	1	1	......	.....	45.00	540	...	......	..	......	....	...	.....	...	......	1	540
Monroe	...	...	....	..	..	....	......	..	...	..	..	...	...	...	......	......	......	....	...	......	..	......	....	...	.....	...	....	.....	....
Montgomery	1	1	3,000	1	1	1,500	4,500	1	1	..	..	12.0	1	1	...	......	50.00	600	1	35.00	..	......	....	1	8	1	2,512	10	3,112
Muscatine	4	4	13,000	2	2	1,800	14,800	5	5	..	..	12.0	3	3	40.00	50.00	37.50	1,440	...	......	..	......	....	4	33	3	5,550	36	6,920
O'Brien	2	2	9,800	..	..	....	9,800	2	2	.	..	12.0	2	2	......	......	62.50	1,500	1	15.00	..	......	105	1	5	...	....	8	1,605
Osceola	2	1	1,800	..	..	....	1,800	1	...	..	1	3.0	1	1	...	.	50.00	150	...	....	..	......	....	...	.....	...	......	.....	150
Page	3	3	8,500	..	..	....	8,500	3	2	1	..	10.5	3	3	40.00	50.00	57.08	1,730	3	28.66	..	......	436	3	18	2	4,000	24	6,166
Palo Alto	17	16	52 700	..	..	....	52,700	15	15	..	..	12.0	16	16	45 00	59.00	53.03	9,520	10	23.56	2	25.00	2,572	18	7	7	900	35	12,992
Plymouth	7	7	24,400	..	..	....	24,400	5	4	1	..	11.0	7	7	50 00	61.22	60.00	3,205	3	25.00	..	.....	540	4	24	4	5,849	34	9,594
Pocahontas	5	4	14,500	..	..	....	14,500	4	2	2	..	10.0	3	3	50 00	55.00	50.00	1,730	8	43.33	..	......	1,160	4	38	2	1,200	44	4,090
Polk	6	5	1,900	..	..	....	1,900	5	5	..	..	12.0	5	5	37.50	50.00	53.33	2,970	2	35.00	1	20.00	800	3	10	1	....	18	3,770
Pottawattamie	5	5	14,300	..	..	....	14,300	5	2	2	1	9.5	4	4	50.00	65.00	55 00	2,000	1	35.00	..	......	280	4	29	4	11,315	34	13,515
Poweshiek	6	5	13,500	..	..	....	13,500	5	4	1	..	11.0	4	4	40.00	55.00	47.50	2,280	4	24.50	..	......	666	4	19	4	4,450	27	7,396
Ringgold	2	1	1,000	1	1	2,000	3,000	1	...	1	..	8 0	1	1	......	......	55.00	440	...	......	..	......	....	1	4	1	1,800	5	2,240
Sac	14	14	42,300	..	..	....	42,300	14	12	2	..	11.5	14	14		......	49.16	7,960	11	30.61	..	......	3,305	7	49	5	7,364	74	18,629
Scott	3	2	6,500	..	..	....	6,500	2	1	..	1	7 0	2	2	50.00	65.00	50 00	715	...	......	..	......	....	2	3	1	150	5	865
Shelby	4	3	900	..	..	....	900	3	2	1	..	11.0	2	2	40.00	65.00	60 00	1,850	3	20.00	..	......	675	3	17	3	4,391	22	6,416
Sioux	8	8	26,500	1	1	1,500	28,000	8	4	3	1	11.0	8	8	47.50	57.50	52 50	3,970	5	26.00	..		1,100	5	20	5	4,157	33	9,257
Story	13	11	59,300	1	1	800	60,100	8	8	..	..	12.0	11	11	47.00	56.50	61.11	7,505	8	31.62	1	30.00	2,644	9	70	9	24,614	90	34,963
Tama	6	6	14,600	..	.	....	14,600	4	...	3	1	7.5	4	4	30.00	50 00	46.66	1,150	3	23.33	..	.....	390	4	19	4	7,291	26	8,831
Taylor	5	4	13,800	1	0	....	13,800	3	2	1	..	11.0	3	3	55 00	75.00	47.50	1,720	2	26.50	1	35.00	930	3	11	3	2,070	17	4,720
Union	5	5	24,300	5	5	7,250	31,550	5	4	1	..	11.0	5	5	60.00	69.20	53.75	3,055	4	37.50	4	30.00	2,840	2	17	2	624	20	6,019
Van Buren	1	1	3.000	1	1	900	3 900	...	...	..	..	....	...	...	......	......	......	....	...	......	..	......	....	...	.....	...	....	.....	....
Wapello	5	5	11 200	.	..	....	11,200	3	2	1	..	11.0	2	2	50.00	55.00	50.00	1,230	1	25.00	..	......	200	1	12	1	2,000	15	3,430
Warren	3	3	7,500	..	..	....	7,500	2	1	1	..	9.0	2	2	.....	...	57.50	1,140	1	40.00	..	......	240	...	.....	...	....	3	1,380
Washington	7	7	27.000	..	..	....	27,000	7	3	4	..	11.0	7	7	32.50	50.00	43.00	3,255	6	24.33	1	15.00	1,388	6	39	3	9,780	53	14,423
Wayne	3	3	14,000	3	3	5,000	19, 00	5	3	2	..	10.0	3	3	.. ...	......	48.33	1,290	4	28.25	..	......	1,166	2	29	1	5.600	36	8,056
Webster	7	7	20.000	..	..	....	20,000	7	4	2	1	9.5	5	5	.....	.....	48.00	2,630	3	19.00	..	......	359	5	19	3	1,800	27	4,789
Winnebago	6	6	22,000	8	8	10,400	32,400	8	8	..	..	12.0	6	6	45.00	65.00	50.00	2,460	7	37.57	..	......	3,156	2	5	1	2,504	18	8,120
Winneshiek	20	13	33,850	1	..	....	33,850	7	6	..	1	11.5	16	16	40.00	57.50	47.14	6,920	14	28.71	1	18.00	2,598	6	49	4	9 903	79	19,421
Woodbury	..	...	......	..	..	....	.....	...	...	..	..	....	...	...	......	......	......	....	...	......	..	......	....	...	.....	...	....	.....	....
Worth	8	6	15,800	..		....	15,800	5	5	..		12.0	8	8	23.75	28.75	59.57	5,316	3	19 00	..	......	584	5	21	5	5,365	32	11,265
Wright	4	4	8,700	..	..	....	8,700	2	2	..	..	12.0	3	3	40.00	50.00	57.50	1,320	1	16.66	..	......	200	2	10	1	1,165	14	2,685
Total	725	516	$2,083,705	85	85	$127,150	$2,2 0,855	655	560	78	20	10.4	646	646	$41.80	$52.66	$51.82	$459,375	354	$22 80	37	$30 05	$99,520	411	2.520	329	$585,820	3 145	$ 1.144.715

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* When member of firm is butter-maker, $50 per month for the time operated is allowed.

TABLE No. XII.

Creamery list arranged by counties, showing number of creameries and skim stations receiving milk and total pounds received, and the number of creameries manufacturing butter, together with kinds and total pounds made, for the year ending May 1, 1896; also disposition of the butter.

COUNTIES.	NUMBER OF CREAMERIES AND SKIM STATIONS RECEIVING AND TOTAL POUNDS OF MILK RECEIVED, FROM MAY 1, 1895, TO MAY 1, 1896.			NUMBER OF CREAMERIES MANUFACTURING BUTTER, TOTAL POUNDS AND VALUE OF ALL BUTTER MANUFACTURED FROM MAY 1, 1895, TO MAY 1, 1896; GIVING POUNDS OF SEPARATOR, GATHERED CREAM, AND COMBINED SEPARATOR AND GATHERED CREAM.							TOTAL POUNDS OF BUTTER FURNISHED PATRONS, MARKETED IN IOWA, AND SHIPPED TO POINTS OUTSIDE OF THE STATE.			
	Number receiving milk.	Number reported	Number pounds of milk received	No of creameries manufacturing.	Number reported	Total pounds separator.	Gathered cream.	Combined separator and gathered cream.	Total pounds manufactured.	Total value of all butter manufactured.	Number reported	Number pounds furnished patrons.	Number pounds marketed in Iowa.	Number pounds shipped to points outside of the state.
The State	715	479	1,006,964,031	725	560	44,324,297	11,954,973	1,452,770	57,732,040	$ 10,207,646 88	572	1,971,372	1,759,792	54,000,876
Adair	6	3	6,287,463	5	3	258,659	....	....	258,659	49,185.00	8	3,893	0	254,766
Adams	5	0	..	1	.....	....	....	....	....	....	......	....	....	....
Allamakee	4	2	11,177,529	13	9	482,270	704,969	....	1,187,239	211,202.40	9	27,501	14,360	1,145,378
Appanoose	0	......	......	......	.....	....	....	....	....	....	......	....	....	....
Audubon	5	4	7,677,761	5	4	327,000	....	....	327,000	59,509.76	4	18,902	0	308,098
Benton	10	7	9,862,957	9	8	397,224	29,215	....	426,439	70,931 63	8	6,189	23,391	396,859
Black Hawk	22	21	54,461,369	22	21	2,316,458	......	....	2,316,458	429,436.21	21	111,638	196,788	2,008,032
Boone	3	1	635, 91	4	2	21,412	98,367	....	119,779	21,560 22	2	643	9,870	109,336
Bremer	25	23	57,050,314	24	23	2,451,190	310	....	2,451,500	438,273 47	22	145,823	67,727	2,237,950
Buchanan	17	13	52,651,490	16	13	2,172,845	....	....	2,172,845	394,343 65	13	94,908	20 259	2,057,678
Buena Vista	9	5	8,685,117	7	5	292,507	81,956	....	374,463	65,039 31	5	4,800	....	369,663
Butler	17	14	29,878,109	17	15	1,256 210	477,014	....	1,733,224	322,559 54	15	49,640	21,124	1,662,460
Calhoun	6	5	6,896,000	7	6	260 400	20,000	....	280,400	50,280 00	6	3,720	8,000	268,680
Carroll	8	5	6,896,800	8	5	278,404	....	....	278,404	52,104 71	5	598	598	277,208
Cass	3	......	....	2	2	....	88,000	....	88,000	16,140.00	2	....	....	88,000
Cedar	5	3	8,755,576	5	4	150,718	393,475	....	544,193	93,852.80	4	22,807	23,800	497,586
Cerro Gordo	10	10	13,601,860	10	9	568,911	123,411	....	692,322	117,859 91	9	38,529	....	653,793
Cherokee	6	1	1,575,000	6	1	63,000	....	....	63 000	11,340 00	1	....	....	63,000
Chickasaw	19	18	49,706,827	19	18	2,150,524	263,947	....	2,414,471	394,941 10	18	114,305	37,317	2,272,849
Clarke	4	1	517,366	2	1	19,736	....	....	19,736	2,950.40	1	....	1,356	18,380
Clay	6	5	8,851,674	6	5	377,670	....	....	877,600	64,272 08	5	26,046	950	350,604
Clayton	20	17	58,615,610	20	18	2,464,571	56,007	80,000	2 601,478	475,421 06	18	108,024	42,128	2,440,724
Clinton	15	3	2,830,476	9	3	130,038	4,535	....	134,573	23,033 89	3	6,207	......	128,276
Crawford	5	2	4,287,500	4	2	175,003	....	....	175,003	30,514 00	2	3,050	500	170,913
Dallas	5	4	5,487,307	6	5	225,307	62,000	....	287,307	49,185.29	5	8,611	53,919	224,757

[illegible]	8	1	984,620	3	1	11,880	87,300		78,770	14,178.00	1		78,770
Decatur													
Delaware	27	21	59,001,680	25	21	2,467,623			2,467,623	456,368.43	21	139,528	36,082	2,292,013
Des Moines													
Dickinson	3	1	1,111,839	2	1	47,820			47,820	7,421.42	1	4,439		43,381
Dubuque	28	24	43,437,533	26	24	1,765,455			1,765,455	322,153.92	24	51,842	70,080	1,643,533
Emmet	5	4	7,407,029	4	4	307,857			307,857	58,734.92	4	7,040	3,726	297,091
Fayette	24	20	70,275,950	22	20	2,866,365	77,725		2,944,090	534,747.97	20	161,632	52,992	2,729,466
Floyd	7	6	17,965,905	8	7	715,893	327,088		1,042,981	183,899.23	7	9,600	26,666	1,006,715
Franklin	9	8	14,683,060	9	8	653,981	226,640		880,621	128,095.14	8	15,780	11,916	852,925
Fremont	0												
Greene	6	4	6,663,942	6	5	248,098	63,200		311,298	58,569.78	5	8,524		302,776
Grundy	16	10	28,474,901	16	11	1,154,265	131,557		1,285,822	223,481.45	11	32,110	6,127	1,247,585
Guthrie	6	2	1,263,345	4	2	52,671	172,800		225,471	33,520.78	2			225,471
Hamilton	6	5	12,666,921	6	5	550,191			550,191	101,099.96	5	7,865		542,326
Hancock	11	8	2,680,339	6	4	109,080	72,468		181,548	30,982.48	4	4,694		176,856
Hardin	7	5	4,743,493	9	7	243,366	102,495		345,861	100,068.03	7	1,000	10,820	334,041
Harrison	2			2									
Henry	2	1	743,728	2	2	29,748	35,000		64,748	11,354.64	2	590	4,500	59,658
Howard	6	3	2,209,700	6	5	88,388	683,594		771,982	133,866.58	5	6,266		765,716
Humboldt	7	4	10,592,813	7	6	440,594	75,018		515,612	86,617.11	6	5,489	2,610	507,513
Ida	4	1	3,500,000	5	2	140,000	25,275		165,275	27,253.00	2			165,275
Iowa				5	4		412,856		412,856	73,412.53	4			412,856
Jackson	14	8	18,410,533	13	10	750,125	317,806		1,067,931	177,773.75	10	38,877	75,915	953,139
Jasper	8	6	8,679,254	9	6	338,444	104,000		442,444	73,335.92	6	8,406	55,222	378,816
Jefferson	7	4	9,406,124	7	4	430,890			430,890	84,418.49	4	24,359	56,890	349,641
Johnson	4	2	863,996	5	3	30,696	73,800		104,496	15,906.48	3	4,124		100,372
Jones	29	14	55,425,339	20	14	2,256,765			2,256,765	434,854.15	14	66,381	168,563	2,021,821
Keokuk	4	3	3,202,561	4	4	130,758	182,957		313,715	43,285.43	4		21,048	292,667
Kossuth	19	14	32,610,302	19	14	1,442,538			1,442,538	252,107.04	14	86,742	3,406	1,352,390
Lee	1			2	1		30,000		30,000	5,000.00	1		7,500	22,500
Linn	27	18	37,981,723	24	19	1,516,896	25,000		1,541,896	273,552.35	19	78,988	32,867	1,430,041
Louisa				3	1			36,000	36,000	6,000.00	1		9,000	27,000
*Lucas	2	1											
Lyon	3	1	814,521	3	1	38,058			38,058	6,500.00	1	2,467		35,591
Madison	4	3	4,213,245	5	4	175,720	6,000		181,720	32,328.60	4	3,850		177,870
Mahaska	1			2	1		176,790		176,790	26,518.50	1	8,839		167,951
Marion	2	1	1,550,000	4	3	62,000	138,847		200,847	36,152.00	3			200,847
Marshall	4	4	3,951,172	8	8	164,444	645,738		810,182	138,964.66	8	5,480	95,450	709,252
Mills	1	1	210,000	3	3	8,400	160,000		168,400	16,388.00	3		15,000	153,400
Mitchell	2	1	740,000	10	8	30,962	1,171,389		1,202,351	198,390.15	8	10,108		1,192,243
*Monona	1												
Monroe													
*Montgomery	2												
Muscatine	5	1	120,000	4	4	4,800	293,770	170,000	468,570	79,026.64	4	2,536	22,392	443,642
O'Brien	2	2	3,909,271	2	2	159,139			159,139	28,578.39	2	5,378	600	153,161
Osceola	2	1	134,777	2	1	5,381			5,381	817.81	1		1,081	4,300
Page	2	2	1,697,893	3	3	67,881	96,000		163,881	27,979.97	2	3,473	8,772	151,636
Palo Alto	17	14	33,738,716	17	14	1,690,309			1,690,309	295,679.93	14	126,232	2,418	1,561,659

TABLE No. XII—CONTINUED.

COUNTIES.	NUMBER OF CREAMERIES AND SKIM STATIONS RECEIVING, AND TOTAL POUNDS OF MILK RECEIVED, FROM MAY 1, 1895, TO MAY 1, 1896			NUMBER OF CREAMERIES MANUFACTURING BUTTER, TOTAL POUNDS AND VALUE OF ALL BUTTER MANUFACTURED, FROM MAY 1, 1895, TO MAY 1, 1896; GIVING POUNDS OF SEPARATOR, GATHERED CREAM, AND COMBINED SEPARATOR AND GATHERED CREAM.							TOTAL POUNDS OF BUTTER FURNISHED PATRONS, MARKETED IN IOWA, AND SHIPPED TO POINTS OUTSIDE OF THE STATE.			
	Number receiving milk.	Number reported	Number pounds of milk received	No. of creameries manufacturing.	Number reported	Total pounds separator.	Gathered cream.	Combined separator and gathered cream.	Total pounds manufactured.	Total value of all butter manufactured.	Number reported	Number pounds furnished patrons.	Number pounds marketed in Iowa.	Number pounds shipped to points outside of the state.
Plymouth	7	5	7,898,707	7	5	344,257	....	....	344.257	62,844 83	5	18,962	....	325,295
Pocahontas	5	4	10,770,650	5	4	453,243	189,768	....	643,011	115,123.86	4	9,600	....	633,411
Polk	6	5	7,488 195	6	5	303,069	....	....	303 069	56,646.96	5	10,302	205,105	87,662
Pottawattamie	4	3	1,690,532	5	4	69,936	243,000	....	312,936	54,191.68	4	11,430	12,000	289,506
Poweshiek	2	2	1,022,500	6	5	40,900	232,229	....	273,129	43,920 94	5	626	25,887	246,616
Ringgold	2	.....	....	2	1	....	700,000	....	700,000	126,000.00	1	....	....	700,000
Sac	14	12	23,206,364	14	12	926,131	13,000	....	939,131	170,119.81	12	24,683	9,575	904,873
Scott	2	8	....	3	1	....	20,500	....	20,500	3.485 00	1	205	15,375	4,920
Shelby	3	3	5,217,941	4	3	218,927	....	....	218,927	39.064.27	3	....	....	218 927
Sioux	9	6	10,004.421	8	6	401,812	....	....	401,812	71,291.31	6	4,633	2,160	395,019
Story	14	11	32,390,102	13	11	1,269,255	10.000	....	1,279,255	231,856.02	11	39,180	32.559	1,207,516
Tama	2	.....	....	6	4	....	402,335	....	402,335	58,548.62	4	....	5,652	396,683
Taylor	6	2	1,166.152	5	2	52,868	....	....	52,868	11,090.74	2	....	....	52,868
Union	10	3	5,563,258	5	3	228,121	....	....	228,121	35,170.11	3	17,957	9,000	201,164
Van Buren	2	.....	....	1	.....	....	....	....	....	....	.....	....	....	....
Wapello	5	3	2,471,608	5	3	145,860	....	....	145,860	26,314 80	3	2,118	16,600	79,242
Warren	3	1	1.240,000	3	1	46,640	.....	....	46,640	6,696.00	1	....	....	46,640
Washington	5	4	6 634.854	7	7	260,100	242,380	....	502.480	93,418 40	7	....	45,750	456,730
Wayne	6	3	7,800,000	3	3	321,000	....	....	321,000	49.800 00	3	....	6,000	315,000
Webster	5	4	1,585,566	7	6	77,301	159,000	....	236,301	31,933.40	6	2,870	9,724	223,707
Winnebago	14	4	7,400,884	6	5	338,507	138.591	900,000	1,377,098	250,525.65	5	63,390	....	1.313,708
Winneshiek	6	.....	....	20	13	....	1,013,058	266,770	1,279,828	204,855 80	13	....	8,893	1,275,985
Woodbury	....	.....	....	....	.....	....	....	....	....	....	.....	....	....	....
Worth	7	6	....	8	6	579,604	291,803	....	871,407	148.423.79	8	29,379	4,662	837,866
Wright	2	2	1,376,157	4	3	55,981	12,000	....	67,981	12,279.68	3	3,000	....	64,981
Lucas Monona Montgomery	*...	2	2,018,727	8	3	123,787	18,000	....	141,757	25,045.78	8	3,870	32,172	105,715
Total	715	470	1,006,934,031	725	560	44,324,257	11,054,073	1,452,770	57,739,040	$ 10,207,646.88	572	1,971,372	1,750,793	54,000,876

* The information from counties having but one creamery reported is shown collectively in the brace.

TABLE No. XIII.

Compiled by counties, showing destination and amounts of butter shipments from 455 Iowa creameries to the principal markets of the United States, together with percentage of the whole amount billed to each market, for the year ending May 1, 1896.

COUNTIES.	No. creameries reporting.	New York—68.6 per cent.	Chicago—12.6 per cent.	Boston—12 per cent.	Philadelphia—3.4 per cent.	Elgin, Ill.—.33 per cent.	Pittsburg—.33 per cent.	St. Louis—.28 per cent.	Cleveland—.60 per cent.	New Orleans—.61 per cent.	Pacific coast—.32 per cent.	New Haven, Ct. —.34 per cent.
The state	455	30,295,633	5,580,289	5,307,350	1,543,939	145,979	147,106	125,906	270,532	277,541	142,880	159,474
Adair	2	....	231,877	12,000	....	....	....	....	....	....	....	....
Adams	....	....	....	....	....	....	....	....	....	....	....	....
Allamakee	8	406,794	103,469	371,779	160,119	....	....	....	....	....	....	....
Appanoose	....	....	....	....	....	....	....	....	....	....	....	....
Audubon	4	79,213	7,960	230,925	....	....	....	....	....	....	....	....
Benton	5	109,246	63,354	2,958	1,986	....	....	2,736	....	....	....	....
Black Hawk	18	1,174,158	117,870	25,659	717	17,876	8,752	....	121,168	....	....	....
Boone	1	29,520	59,047	....	....	....	....	....	....	....	....	....
Bremer	23	1.879,609	85,112	63,024	19,786	....	....	....	148,794	....	....	....
Buchanan	9	1,708,458	32,906	....	....	....	....	....	....	....	....	....
Buena Vista	3	179,385	18,000	....	36,000	....	....	....	....	....	....	....
Butler	10	736,477	18,108	118,318	589	....	....	14,235	....	....	....	....
Calhoun	4	169,384	19,123	....	....	....	....	....	....	....	....	....
Carroll	4	97,553	25,479	....	7,177	....	....	....	....	....	....	....
Cass	2	12,000	75,000	1,000	....	....	....	....	....	....	....	....
Cedar	3	67,882	246,044	....	2,120	....	....	....	....	....	....	....
Cerro Gordo	7	371,808	45,430	....	238	....	....	104,615	....	....	....	....
Cherokee	....	....	....	....	....	....	....	....	....	....	....	....
Chickasaw	16	1,720,673	57,618	130,797	1,200	96,902	....	....	....	....	....	....
Clarke	1	....	18.157	....	903	....	....	4,320	....	....	....	....
Clay	5	150,935	11,741	....	....	....	....	....	....	....	....	....
Clayton	13	1,601,801	36,885	83,000	600	....	....	....	....	....	....	....
Clinton	2	36,600	48,511	....	....	....	....	....	....	....	....	....
Crawford	2	94,742	76,171	....	....	....	....	....	....	....	....	....
Dallas	3	95,900	7,857	....	....	....	....	....	....	....	....	....
Davis	1	78,770	....	....	....	....	....	....	....	....	....	....
Decatur	....	....	....	....	....	....	....	....	....	....	....	....
Delaware	16	1,447,650	44,314	53,773	10,190	81,201	....	....	....	....	150	....
Des Moines	....	....	....	....	....	....	....	....	....	....	1,050	....
Dickinson	1	43.381	....	....	....	....	....	....	....	....	....	....

TABLE No. XIII—CONTINUED.

COUNTIES.	No. creameries reporting.	New York—68.6 per cent.	Chicago—12.6 per cent.	Boston—12 per cent.	Philadelphia—3.4 per cent.	Elgin, Ill.—.33 per cent.	Pittsburg—.33 per cent.	St. Louis—.28 per cent.	Cleveland—.60 per cent.	New Orleans—.61 per cent.	Pacific coast—.33 per cent.	New Haven, Ct.—.34 per cent.
Dubuque	18	1,083,495	47,527	79,928	42,076	....	....	....	570	....	....	....
Emmet	2	107,987	2,370	....	....	....	....	....	....	....	....	....
Fayette	17	1,185,765	377,478	120,432	190,218	....	....	....	....	....	....	....
Floyd	3	116,509	102,054	....	....	....	....	....	....	....	....	....
Franklin	8	599,728	22,344	9,119	300	....	....	....	....	....	....	....
Fremont	....	....	....	....	....	....	....	....	....	....	....	....
Greene	4	90,838	76,000	39,000	....	....	85,000	....	....	....	....	....
Grundy	9	895,602	42,360	85,933	1,800	....	....	....	....	....	....	....
Guthrie	1	51,600	....	103,200	51,600	....	....	....	....	....	....	....
Hamilton	3	367,833	15,200	18,000	33,496	....	....	....	....	....	....	....
Hancock	3	127,571	4,347	....	....	....	....	....	....	....	....	....
Hardin	6	371,958	58,100	....	220	....	....	....	....	....	....	....
Harrison	....	....	....	....	....	....	....	....	....	....	....	....
Henry	....	....	....	....	....	....	....	....	....	....	....	....
Howard	4	510,734	44,800	189,582	8,200	....	....	....	....	....	....	....
Humboldt	5	327,153	139,242	7,740	18,300	....	....	....	....	....	....	....
Ida	2	152,638	11,727	....	....	....	....	....	....	....	....	....
Iowa	4	288,363	12,247	100,000	....	....	....	....	....	....	....	....
Jackson	9	152,242	574,079	34,723	....	....	....	....	....	....	....	....
Jasper	5	189,628	74,787	....	....	....	....	....	....	....	....	....
Jefferson	4	276,502	6,649	65,000	590	....	....	....	....	....	....	....
Johnson	8	27,882	67,490	....	5,000	....	....	....	....	....	....	....
Jones	18	707,308	75,072	1,053,160	15,196	....	97,854	....	....	....	....	....
Keokuk	4	181,000	85,428	25,635	12,000	....	....	....	....	....	....	....
Kossuth	14	883,399	268,148	6,000	....	....	....	....	....	....	....	....
Lee	....	....	....	....	....	....	....	....	....	....	....	....
Linn	14	563,045	110,918	159,110	10,800	....	....	....	....	....	100,000	....
Louisa	1	26 000	....	1,000	....	....	....	....	....	....	....	....
Lucas	1	21,068	20,712	....	....	....	....	....	....	....	....	....
Lyon	1	....	1,850	33,741	....	....	....	....	....	....	....	....
Madison	4	48,090	6,000	....	374,850	....	....	....	....	....	....	....
Mahaska	1	26,518	8,840	....	182,598	....	....	....	....	....	....	....
Marion	2	86,248	....	52,604	....	....	....	....	....	....	....	....
Marshall	6	78,140	141,160	427,468	....	....	....	....	....	....	....	22,000
Mills	2	30,000	70,000	....	1,000	....	....	....	....	....	....	....

Mitchell	8	947,435	5,718	30,962								119,690
Monona												
Monroe												
Montgomery	1	53,985										
Muscatine	4	744,880	64,671	12,500	81,564					124,327		
O'Brien	3	87,811	67,840									
Osceola												
Page	3	76,800	25,000		19,200							
Palo Alto	11	1,031,308	40,069	6,950								
Plymouth	6	231,115	90,430									
Pocahontas	4	217.113	169 081	94,000						153,217		
Polk	2	6.735	38,250									
Pottawattamie	5	95,000	194,060	10,749								
Poweshiek	4	173,888	59,103	2,705								
Ringgold	1	700,000										
Sac	9	608,699		105,760	45,000							
Scott	1		2,520									
Shelby	2	88,089	128,089									
Sioux	5	272,779	23,841	10,000								
Story	10	1,203,630	260,633	61,413	25,000							
Tama	3	20,012	147,380	23,568	12,429							
Taylor	2	48,168	47,200									
Union	2	12,490	2,200									17,794
Van Buren												
Wapello												
Warren												
Washington	4	85.200	151,680									
Wayne	3	92,000	118.000	5.600	6,000		6,000					
Webster	5	86,975	85,752	39,200								
Winnebago	4	445,708	7,000	850,000								
Winneshiek	11	438,254	55,300	412,021	189,843							
Woodbury												
Worth	7	654,121	180	7,694	74.699							
Wright	2	51,791		600	390							
Total	455	30,295,633	5,680,289	5,307,350	1.543,939	145.979	147.106	125.976	270.532	277,544	142,880	159,474

NOTE.—The cities receiving shipments aggregating less than 100,000 pounds are here given, together with the amount billed to each: Cincinnati, 49,579; Washington. D. C., 40.226; Moline, Ill., 39 618; Galesburg, Ill., 38,900; New Bedford, 28.500; Newark, N. J., 20,788; Butte, Mont., 18,000; Anaconda, Mont., 12,636; Aurora, Ill., 4,233; Detroit, Mich., 3,540; Blockton, Mass., 1,500. Total, 237,396 pounds, which is .6 per cent of 1 per cent of the total shipments reported.

TABLE No. XIV.

Compiled by counties, showing the average per cent of butter fat in milk for each month and the average for the twelve months ending June 1, 1896, in the different counties, together with the total average per cent for 191 creameries reported, and for each month and for the entire year.

COUNTIES.	Creameries reporting.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average for year.
The state	191	3.65	3.67	3.79	3.80	3.96	4.05	4.12	4.02	3.89	3.81	3.71	3.69	3.84
Adair	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Adams	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Allamakee	2	3.47	3.57	3.73	3.76	3.83	3.83	4.07	4.07	3.83	3.72	3.57	3.52	3.75
Appanoose	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Audubon	2	3.44	3.61	3.67	3.73	3.78	3.28	3.55	3.78	3.70	3.69	3.63	3.48	3.46
Benton	3	3.39	3.34	3.47	3.54	3.76	3.65	3.75	3.68	3.47	3.43	3.41	3.38	3.51
Black Hawk	14	3.67	3.73	3.85	3.95	4.05	4.28	4.13	4.04	3.95	3.83	3.22	3.54	3.90
Boone	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Bremer	7	3.93	3.99	4.05	4.16	4.24	4.21	4.26	4.11	4.14	4.00	4.08	4.02	4.02
Buchanan	6	3.52	3.55	3.66	3.75	3.81	4.03	4.13	4.07	3.90	3.83	3.78	3.92	3.80
Buena Vista	1	3.75	3.80	3.90	3.95	4.00	4.05	4.00	4.10	4.05	4.05	3.80	3.75	3.93
Butler	4	3.68	3.67	3.82	3.91	3.96	3.99	4.03	4.02	3.86	3.85	3.75	3.75	3.84
Calhoun	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Carroll	1	3.70	3.60	3.60	3.70	4.00	4.10	4.00	3.90	3.90	3.80	3.80	3.50	3.80
Cass	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Cedar	1	3.99	3.40	3.48	3.57	3.65	3.40	3.40	3.40	3.61	3.61	3.57	3.40	3.61
Cerro Gordo	5	3.62	3.60	4.30	3.85	3.93	4.01	3.99	3.91	3.81	3.71	3.69	3.75	3.71
Cherokee	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Chickasaw	9	4.19	4.13	4.28	3.08	4.12	4.19	4.00	4.05	3.97	4.06	4.10	4.05	4.01
Clarke	1	3.10	3.60	3.60	3.80	4.00	4.00	4.00	4.00	4.00	3.80	3.80	3.50	3.50
Clay	1	3.50	3.70	3.40	4.00	4.00	4.60	4.00	4.00	3.70	3.60	3.60	3.70	3.50
Clayton	7	3.70	3.77	3.85	3.88	4.08	4.17	4.27	4.23	3.92	3.77	3.72	3.66	3.89
Clinton	2	3.37	3.58	3.52	3.72	3.89	4.20	4.04	3.79	3.61	3.41	3.48	3.38	3.66
Crawford	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Dallas	3	4.00	3.71	3.83	3.90	4.00	4.10	4.16	4.24	4.14	4.20	3.85	3.81	3.94
Davis	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Decatur	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Delaware	8	3.59	3.71	3.83	3.86	4.06	4.26	4.28	4.11	3.96	3.84	3.79	3.68	3.88
Des Moines	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Dickinson	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Dubuque	8	3.63	3.75	3.87	3.81	4.03	4.10	4.16	4.26	4.07	3.77	3.83	3.78	3.89
Emmet	1	3.72	3.78	3.68	3.68	3.98	4.18	4.06	3.76	3.70	3.60	3.63	3.40	3.76
Fayette	9	3.57	3.59	3.91	3.80	3.81	3.93	4.02	3.94	3.82	3.66	3.58	3.46	3.58
Floyd	1	3.30	3.20	3.50	3.50	3.60	3.60	3.90	3.90	4.00	3.70	3.70	3.50	3.60
Franklin	5	3.66	3.61	3.69	3.80	3.85	3.97	4.21	4.08	3.95	3.80	3.69	3.85	3.81
Fremont	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Greene	2	3.70	3.73	3.86	3.92	3.93	4.05	4.18	4.13	4.11	3.78	3.67	3.58	3.84
Grundy	4	3.68	3.71	3.79	3.88	3.90	4.07	4.03	3.93	3.83	3.80	3.77	3.45	3.63
Guthrie	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Hamilton	3	3.50	3.57	3.61	3.78	3.88	4.00	4.11	4.06	4.06	3.70	3.74	3.64	3.82
Hancock	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Hardin	2	3.61	3.65	3.69	3.70	3.77	3.77	3.80	3.55	3.71	3.71	3.66	3.62	3.70
Harrison	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Henry	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Howard	....	....	....	....	....	....	....	....	....	....	....	....	....	....

TABLE No. XIV—CONTINUED.

COUNTIES.	Creameries reporting.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average for year.
Humboldt	4	3.46	3.58	3.60	3.63	3.93	4.20	4.03	3.93	3.75	3.80	3.68	3.71	3.76
Ida	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Iowa	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Jackson	2	3.85	3.80	3.80	3.90	4.02	4.09	4.10	4.00	4.00	3.88	3.75	3.73	3.88
Jasper	3	3.80	3.73	3.70	3.80	4.00	4.13	4.23	4.07	4.08	3.77	3.90	3.80	3.86
Jefferson	2	3.50	3.62	3.70	3.87	4.00	4.12	4.35	4.46	4.20	3.85	3.53	3.47	3.90
Johnson	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Jones	8	3.48	3.53	3.67	3.82	4.01	4.11	4.14	3.93	3.81	3.73	3.65	3.56	3.82
Keokuk	1	3.30	3.30	3.50	3.50	3.60	3.80	4.20	4.00	4.00	3.80	3.60	3.50	3.60
Kossuth	6	3.58	3.61	3.72	3.92	3.95	3.92	3.99	3.90	3.86	3.78	3.71	3.62	3.77
Lee	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Linn	7	3.48	3.52	3.73	3.82	3.92	4.13	4.15	4.00	3.86	3.70	3.63	3.61	3.85
Louisa	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Lucas	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Lyon	1	3.30	3.50	3.60	3.80	3.80	3.80	4.00	4.00	4.20	4.20	4.00	3.50	3.80
Madison	2	3.31	3.40	3.50	3.30	3.76	4.00	4.25	4.25	4.13	3.90	3.90	3.30	3.97
Mahaska	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Marion	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Marshall	2	3.69	3.72	3.77	3.78	3.86	3.87	3.88	3.84	3.80	3.80	3.91	3.71	3.73
Mills	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Mitchell	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Monona	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Monroe	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Montgomery	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Muscatine	1	3.90	4.00	4.00	4.00	4.00	4.00	4.25	4.00	3.80	3.50	3.40	3.40	3.85
O'Brien	1	3.50	3.50	3.50	3.60	3.60	3.70	3.50	3.50	3.60	3.60	3.60	3.54	3.56
Osceola	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Page	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Palo Alto	8	3.75	3.81	3.89	4.03	4.30	4.24	4.04	4.10	3.93	3.96	3.8[illegible]	3.78	3.91
Plymouth	1	3.57	3.40	4.04	4.04	4.25	4.25	4.04	4.04	3.43	3.40	3.40	3.43	3.79
Pocahontas	1	3.55	3.60	3.61	3.61	3.74	3.82	3.82	3.61	3.61	3.52	3.52	3.52	3.62
Polk	2	3.40	3.60	3.80	3.80	3.90	4.20	4.30	4.30	3.80	3.90	3.62	3.50	3.71
Pottawattamie	2	3.45	3.45	3.45	3.60	3.65	3.80	3.80	3.80	3.80	4.05	4.00	3.80	3.70
Poweshiek	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Ringgold	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sac	4	3.79	3.92	3.98	4.11	4.21	4.30	4.19	4.22	4.12	4.05	3.97	3.80	4.06
Scott	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Shelby	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sioux	1	3.60	3.40	3.50	3.50	3.60	3.60	3.60	3.50	3.70	3.50	3.60	3.50	3.57
Story	7	3.55	3.62	3.66	3.71	3.94	4.01	4.08	4.04	3.87	3.79	3.63	3.55	3.79
Tama	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Taylor	2	3.23	3.23	3.31	3.40	3.40	3.40	4.08	4.08	3.90	3.99	3.40	3.74	3.65
Union	1	3.47	3.42	3.48	3.64	3.70	3.72	3.75	3.81	3.80	3.85	3.73	3.62	3.51
Van Buren	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wapello	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Warren	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Washington	1	3.30	3.40	3.50	3.50	3.70	4.00	4.10	4.50	4.50	4.20	3.80	3.40	3.80
Wayne	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Webster	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Winnebago	3	3.68	3.62	3.73	3.87	3.96	4.00	3.99	3.93	3.80	3.79	3.73	3.66	3.76
Winneshiek	1	3.70	3.80	4.10	4.30	4.40	4.30	4.00	4.00	4.00	3.90	3.70	3.70	3.99
Woodbury	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Worth	3	3.55	3.50	3.50	3.62	3.62	3.93	3.93	3.69	4.21	3.56	3.87	3.42	3.75
Wright	2	3.60	3.60	3.67	3.80	3.82	3.82	3.85	3.95	3.91	3.84	3.77	3.70	3.70
Total	191	3.65	3.67	3.79	3.80	3.96	4.05	4.12	4.02	3.89	3.81	3.71	3.69	3.84

CITY MILK INSPECTION.

When the system of city milk inspection was first established in Iowa, samples of milk were sent from dealers in cities of this state having more than 10,000 population, to Des Moines, and were tested by this department in the office laboratory. It was found that such a plan was not to the best advantage, for after the sample had been shipped 100 miles or more, and was two or three days old, a fair test could not be made of it. Following this difficulty the dairy commissioner furnished each agent in the different cities with a complete apparatus for making the tests. During the past year, since issuing the last report, two more cities have been added to the list, having reached the required population of 10,000, according to law.

Following is a list of the cities and agents:

Burlington	W. B. McChesney
Cedar Rapids	F. M. Brown
Clinton	Allen E. Rumble
Council Bluffs	Rupert Fleming
Davenport	Dr. A. W. Cantwell
Des Moines	C. C. Chase
Dubuque	Dr. B. Michel
Fort Madison	Camp Thomas
Keokuk	Frank Harshman
Marshalltown	W. W. Rodwell
Muscatine	Emil Kranz
Ottumwa	E. B. Hill
Sioux City	O. P. McCray

During the month of April, Frank H. McCray, milk agent for Sioux City, resigned. O. P. McCray was appointed to succeed him. During the month of September, N. B. Rehkopf, milk agent for Des Moines, and E. W. Edgar, milk agent for Burlington, each resigned. The resignations were caused by the removal of these agents from the cities of their inspection. C. C. Chase was appointed to succeed Mr. Rehkopf as city milk agent for Des Moines, and W. B. McChesney succeeded E. W. Edgar as city milk agent for Burlington. All of the agents have been prompt in the discharge of their duties and watchful over the interest intrusted to their care.

The strict and uniform enforcement of the law has resulted in a general improvement along the line, and the wilful and careless violators of the law are very few. This department has not had occasion to prosecute a single case during the past year.

MILK TESTS.

The total number of tests from dealers made in the thirteen cities for the year ending October 31, 1896, was 5,871; in 1895, 4,633, being an increase of 1,238 tests, of which 137 were made in Ft. Madison and 456 in Marshalltown, leaving a net increase in the other cities of 665. This was caused by the increase in the number of dealers, as shown by the following figures:

Whole number of dealers in 1895, 438; in 1896, 535, an increase of 97, of which 26 belong to Fort Madison and Marshalltown, leaving a net gain of 71 dealers in the other cities. The benefits of constant enforcement of the law upon the quality of milk sold, is shown in the following table, which gives the number of tests below 3 per cent standard in each city for the period of six months in 1894, and twelve months in the years 1895 and 1896:

CITIES.	No. tests below 3 per cent—1894.	No. tests below 3 per cent—1895.	No. tests below 3 per cent—1896.
Burlington	4	4	2
Cedar Rapids	3	3	0
Clinton	6	0	0
Council Bluffs	1	6	10
Davenport	0	0	0
Des Moines	13	28	6
Dubuque	4	0	0
Keokuk	0	0	0
Muscatine	5	7	0
Ottumwa	1	2	0
Sioux City	0	1	0
Total	37	51	18

In Fort Madison there were two tests below standard; none in Marshalltown.

The improvement during the past year has been worthy of notice. The number of tests out of 5,871 falling below standard of 3 per cent was but 20, for all cities. Last year, as will be seen in the above table, there were 51 tests below the standard, out of a total of 4,663. Of the 20 tests below standard in

1896, 10 were in Council Bluffs, and most of the dealers having them, retired from business soon after being notified.

Des Moines, during the year 1895, had 28 of the 51 tests below standard, and this year had but 6, out of 1,064 tests made.

The gradual improvement in the quality of milk sold in our cities under rigid enforcement of the milk testing law of the state is shown in the following table:

A comparison of total number of tests made in each city yearly, with average per cent of butter fat for each year, and average for the four years ending October 31, 1896.

CITIES.	1893.		1894.		1895.		1896.		Average for four years.
	No. tests made.	Average test.	No. tests made.	Average test.	No. tests made.	Average test.	No. tests made.	Average test.	
Burlington	527	3.73	444	3.75	456	3.75	463	3.84	3.77
Cedar Rapids	480	3.78	381	4.00	266	3.89	350	4.16	3.95
Clinton	235	3.71	271	3.88	309	3.71	421	3.77	3.77
Council Bluffs	492	3.53	320	3.63	506	3 64	593	3.83	3.66
Davenport	501	3.65	337	3.66	394	3.58	562	3.77	3.67
Des Moines	545	3.27	655	3.81	1,029	3.70	1,064	3.96	3.68
Dubuque	425	3.35	358	3.51	409	3.90	543	4 08	3.66
Keokuk	246	3.56	287	4.32	316	4.41	289	4.40	4.17
Muscatine	83	3.69	386	3.80	435	3.91	315	3.98	3.85
Ottumwa	78	3.87	193	3.67	237	3.95	174	4.28	4.18
Sioux City	323	3.71	353	3.67	492	3.67	506	3.88	3.73
Marshalltown	....	.....	....	.....	....	.....	456	3.95	3.95
Fort Madison	....	.....	....	.....	....	....	137	4.15	4.15
Total and average test for each year	3,935	3.59	3,984	3.79	4,849	3.82	5,871	4.00	......
Av. test for entire period	....	......	....	......	....	......	....	......	3.86
Total tests made in thirteen cities during entire period	....	......	....	......	....	......	....	. ....	18,639

The first complete record under the milk testing law was made in the year 1893, and the average test for that year was 3.59; for 1894, 3.79; for 1895, 3.82; and for 1896, 4.00. This showing is very satisfactory and has fully demonstrated the benefit to the city milk consumers, of the present system of city milk inspection. We do not expect there will be much more improvement in the average richness of the milk sold in our cities. Milk testing 4 per cent butter fat, which is about

4½ pounds of butter on an average for each 100 pounds of milk, is of high quality. The improvement in the milk supply of our cities in the future should be in the direction of better sanitation. We treated this subject at some length in our last report and do not feel called upon to go over the matter again at this time, but will simply state that an enlargment of the powers of this department and a thorough official inspection and regulations of the sources of the supply of milk, is what the healthfulness and safety of the people of our growing cities need and should have without unnecessary delay.

SANITATION AND HEALTH.

The secretary of the state board of health, Dr. J. F. Kennedy, in the September number of the Health Bulletin, writes upon this subject the following article:

A large and most important part of the "living" in any family who can afford it, is milk and butter. In this western country there are few of our wage-earners, however low their wages, but what have their table supplied more or less with these dairy products.

It is essential to good health that all food should be pure and free from contamination by anything containing disease germs. Milk is especially liable, if the greatest care is not observed, to be thus contaminated. If typhoid fever, scarlet fever, or diphtheria are present in a family of a dairyman the milk is almost sure to become infectious, and many epidemics of those diseases have been traced to such sources. Milk from cows that are tuberculous should never be used for human food—even though boiled, as there is, even if there should not be any menace to the public health, something revolting in using meat or milk from animals that are known to be diseased. Typhoid fever and scarlet fever germs most frequently get into the milk can through contaminated water used for washing the cans, or for other purposes. In scarlet fever the fine scales that are thrown off during convalescence, floating in the air, gain access to the milk supply and the germs producing the disease rapidly multiply and sometimes whole communities are infected by using the milk and are stricken down with the disease.

It is reasonable to suppose that if the milk is from diseased animals, or has been infected, because of the presence of an infectious disease in the family of the dairyman or of some employe connected with the dairy, the butter will be more or less affected also.

The milking is often done in a careless and filthy manner. No pains are taken to wash the udder and teats, and the hands are soiled, and as a result the milk is polluted, has a barnyard taste and soon "spoils."

If there are several cows to be milked some one should go ahead of the milker and wash and thoroughly dry the udder, so that the hands of the milker, previously thoroughly cleansed, cannot be soiled.

We have often witnessed the milking as it was too often practiced. If in the morning the cows get up with the sides and "bag" soiled with their "droppings," the milkers hastily brush off what they can and proceed to work; or in the evening the cows come from the slough, where they have been seeking the scanty water supply and fighting the flies, and the "bag" and belly are covered with mud.

The "straining" of the milk shows in the pail a large amount of sediment—mud or filth, as the case may be. Such milk is not only repulsive to the taste and smell, but is positively dangerous. Hence the importance and necessity of cleanliness.

We are sure a great improvement has taken place in this respect within the last few years. Dairymen are vying with each other in their efforts to secure for their families and their patrons the cleanest and best milk and butter that can be produced. The dairies supplying milk to town and city markets should be often visited, and their methods and environments carefully and impartially, as well as intelligently, inspected, and where their supplies are from dairies properly managed from a sanitary and hygienic standpoint they should have certificates showing the fact, and those dairies where these desirable conditions are not found should be prohibited from selling their wares until they come up to a safe sanitary standard. The state dairy commissioner is untiring in his efforts not only to have the people of the state supplied with a superior quality of milk, from a butter-fat standpoint, but is endeavoring to ascertain the physical condition of the cows supplying the milk, and their sanitary surroundings. Any weakness in the law by which such beneficent efforts may be defeated should be corrected.

The present law provides that the person selling skimmed milk as such, or unclean, impure or unhealthy milk, or milk taken from cows having disease, sickness, ulcers, abscesses or running sores, shall, upon conviction thereof, be fined not less than $25 nor more than $100; but no provision is made for the enforcement of any of these provisions except that of skimmed milk, and the other provisions are of service only in such aggravated cases as attract the attention of the people. The dirty and filthy condition under which much of the city milk is produced still continues to exist as much as if we had no law upon the subject. In regard to skimmed milk the law is explicit. The law defines skimmed milk, as milk that will not test, by any reliable method, three pounds of butter fat to 100 pounds of milk; prohibits its sale unless sold as such; makes it the duty of the dairy commissioner to enforce this provision of the act and authorizes the appointment of agents for the collection of milk samples, but gives the agent no further authority, nor provides for any compensation except for gathering samples of milk to be tested.

With the much needed power to inspect dairy herds and dairy farms, where our milk supply is produced, this department expects to improve in the sanitations and healthfulness of the milk production as well as in the other directions as pointed out in this report. Agents take pains and trouble to ascertain the condition of the dairy herds yet, the allowance made them for the tests, which is $3 per day, with not more than two to five days employed per month, according to the size of the city, it is not expected they shall achieve much good from this line of work.

We are satisfied that the matter of city milk inspection is not fully understood by the people of our cities and therefore we deem it best to explain the system in detail.

MAKING THE TESTS.

The apparatus with which each milk agent makes tests of samples of milk, sold by city milk dealers, consists chiefly of a centrifugal machine, certified D. C. test bottles and pipettes. The dairy commissioner has given each personal instruction in the manner of making the tests and in the use of the machine.

COLLECTING SAMPLES.

It is the common idea among our city milk patrons that samples of milk are procured direct from the dairy herd and tested by the single bottle test. Correcting this impression, it may be understood, that should the test be taken direct from the herd, the time and disposition of the milk thereafter would allow any changes to be made so as to increase the quantity and decrease the quality. In order to obtain the best results, the agent secures a sample from a dealer, while he is in the act of delivering milk to one of his patrons, thus procuring positively a sample of milk which is used by the patron. In testing this sample the actual quality of milk sold is ascertained. For the collection of samples the agent is supplied with a number of small, round cans which contain about one-half pint of milk. This can has a screw top and each is numbered, no two having the same numbers. An average of about fifteen samples are collected by the agent in one day. In order to identify one sample from another, throughout the process of testing, this department has furnished the agent with a small record book which he carries with him in making the collections. The pages of the book are printed especially for this purpose, and allow a space for the name of the dealer, number of his permit, number of the sample can, and number of the D. C. test bottle, together with a space for the test itself, the latter two being inserted after the agent has finished his work.

Samples of milk are frequently collected of both morning and night's supply, and ofttimes the result of a test discloses a wide difference between the two, the latter being usually the poorer in quality.

TESTING APPARATUS.

The method of testing milk is interesting, as it is particular. This department is often called upon to explain the manner of testing milk, and the reliability of the test. For all Iowa cities the Babcock system is used. This consists of the centrifugal machine, test bottles, pipettes, acid measures, thermometers and sulphuric acid hydrometers. The centrifugal machine is a simple contrivance. A wheel between twelve and twenty inches in diameter, according to the size of the machine, is poised upon a smaller wheel about one-fourth the size of the larger, which is set directly under the other, and by means of a cog wheel between the two the larger one is caused to revolve at a great speed varying from 700 to 1,200 revolutions per minute. Attached to the larger wheel, are small cups, into which the test bottles are placed. A cover is used to keep the bottles from being broken or being thrown from these cups.

The hand centrifugal machine used by this department is made to carry as many as fifteen bottles, according to the size of the machine, but these bottles must be so placed as to balance each side of the larger wheel. The Babcock test bottles are made of heavy glass, and are about the shape of an ordinary round bottle, except that the stem is much longer than the body, and is very small. On the stem of the bottle is a graduated scale, by which the butter fat, when separated from the milk, is measured. These bottles contain up to the neck, not less than 40 c. c. Each division of the graduated scale represents .04 c. c., and 5 of these divisions are equal to 1 per cent of butter fat when 18 grams of milk are used in the test, it being assumed that the specific gravity of butter fat at the temperature of 120° F. is 0.9. The graduation extends from 0 to 10 per cent, which is sufficient for all ordinary tests of milk. The graduation of these bottles is tested with mercury which, when the weight is used as a key, is the most positive way of arriving at a correct measurement, and each of the bottles are numbered and marked at the top with the letters "D. C.," which represents Dairy Commissioner, a solution of acid being used to insert the numbers and letters according to the needs of the office.

This department has already issued to the city milk agents, creameries and cheese factories, 1,003 of the bottles which are numbered from one up to the number given; a record of each is kept in the office. The agent having the bottle is required to keep it clean and free from any substance which would adhere to the inside so as to cause an effect upon the sample of milk or solution which is used for the test. On account of the strength of the glass the bottles are not easily broken, and one set usually lasts six or eight months.

The pipette or milk measure, is one of the useful contrivances used in testing milk. It is in form, a long tube, with a bulb in the center. One end of the pipette is small at the very tip, while the other end is the same size the full length. The pipette will hold by the measurements which are marked thereon, when correct, 17.6 c. c. of milk which, if the milk has the average of specific gravity of 1.032, will weigh 18 grams. The pipette is tested by the same means as the bottle, and is used only as a measure. The operator places one end of the pipette in a thoroughly mixed sample of milk, and by drawing the milk into the other end as in a compression of air, is enabled to secure a correct measurement of 18 grams of milk. It must be understood, then, that the 18 grams of milk is the measurement of 100 pounds of milk which is tested. This department has arranged for procuring a large number of these pipettes and each will be tested by a competent chemist. It is the expectation that each creamery having obtained a test bottle from this department shall receive one of these pipettes at a low price.

The acid measure is another particular implement necessary in making the tests. This instrument is made of glass also, and is but a small measure with the graduated scale upon its surface. Sulphuric acid is used to dissolve the casine of the milk. The measure in itself is used only to obtain the correct amount of acid to be used in the test, which is 17.5 c. c. Absolute correctness in measuring the acid is not necessary, as a small variation will not affect the result of its action upon the milk.

With such an apparatus as described the agent is fitted for his work. To the credit of all agents in this state, they have followed the instructions given and found results unquestioned, as taught by the department.

SAMPLES—HOW TESTED.

After having collected samples of milk from the dealers while the milk was placed on sale or in the act of being sold, the agent is ready for the test. His first work is to bring the milk to a proper temperature and then measure it by use of the pipette, and pour it into the bottle, which is done as explained before; drawing a measurement of milk into the pipette by means of suction, and then placing one end of the pipette in the bottle, allowing the milk to run from tube to bottle. Then the correct measurement of acid having the proper temperature and strength is made, and that also poured into the bottle. This solution is well shaken, and causes the substance to change from white to a dull reddish color. The bottle is then ready for the whirl in the centrifugal machine. The agent may prepare all of his samples and whirl them at one time. The centrifugal machine is made to revolve for five minutes, which is equal to between 3,500 and 6,000 revolutions, according to the size of the machine: then a small quantity of hot water is added, and the machine whirled again for one minute. After this process the butter fatty contents of the milk, being of an oilly character, according to the provisions of nature, gathers in the top or the stem of the bottle, and in such a position that it may be measured by means of the graduated scale. The measurement shows the contents of butter fat in 100 pounds of milk of which the sample tested is a part. In another part of this report will be found a list of all Iowa milk dealers. Appended to the name of the dealer and his manner of selling milk, is the yearly average of tests of milk he has sold. These tests range from below 3 per cent up to as high as 7.00, or seven pounds, the average for the state being 4.00, or four pounds of butter fat for each 100 pounds of milk. This table is interesting, and should be studied by all who depend upon the city milk dealers for their supply of the dairy cow's much relished product—the milk.

In some cases, as may be seen, the tests have fallen below the average of 3.00, but any milk testing below this standard is considered as skimmed or partly skimmed milk, the sale of which is prohibited unless advertised and sold as such. The cause of the failure to reach the average is rarely found to be with the cow. There are many occasions when the hand of the unscrupulous and greedy dealer has had a part in rendering the quality of milk he sells poorer than it really was.

This department has been fortunate in avoiding or meeting occasions where prosecutions for the sale of skimmed milk is advisable. Yet we have done much to forestall any and all attempts to sell skimmed milk to our city patrons.

The dealer is as much interested in the city milk test and its results as the consumer, and more often is the one most interested, especially while his milk is advertised in the monthly average as published by local agents. Dealers have been willing and helpful in securing samples for testing. Since they do not know one day from another when the agent is likely to call for a sample of their milk, they usually keep their best quality constantly on sale. This has proven almost invariably true, for many of the tests run about the same, or uniform, the season through.

TESTS OF CREAM.

By referring to the list of dealers and results of cream tests following this article, it will be shown that fifty-nine cream tests have been made during the past year. This is a new feature of the work connected with city milk tests. Frequently agents are requested to test samples of cream. The law does not prescribe a cream test, yet as a matter of education a limited number of tests have been permitted during the past year. There are 278 dealers of the state who sell more or less cream, and from these the fifty-nine samples were taken and tested. These tests are made very much on the same principle as milk tests. The lowest test was 9 per cent, which is, that 9 per cent of 100 pounds of cream was butter fat. The highest test was 27 per cent, and the average for the fifty-nine tests 18.84 per cent. Last year in the report of this department 15 per cent was recommended as the correct standard for cream sold by city milk dealers. It will be shown conclusively that this percentage is reasonable.

NAME OF DEALER.	Date of test.	Test.
Burlington.		
F. M. Parsons	Jan. 7	23.00
F. M. Parsons	Feb. 16	21.60
Cedar Rapids.		
O. G. Smith	Jan. 22	27.00
W. J. Patman	May 23	21.00
Thomas Jewell	May 23	17.00
Williams Bros	June 9	9.00
J. Koutney	June 9	11.00
Council Bluffs.		
J. Ellsworth	Feb. 1	19.80
Davenport.		
H. Wendlehausen	June 23	21 00
M. Raum	June 22	20.40
T. Coglin	June 22	16.20
H. J. Koep	June 23	21.00
Howell & Prinz	June 22	21.00
O. Ruehman	June 22	21.90
John Timon	June 23	23.00
Des Moines.		
Des Moines Dairy Company 5	Nov. 16	13.80
Des Moines Dairy Company 4	Feb. 21	13.80
Des Moines Dairy Company 4	Feb. 24	15.60
Des Moines Dairy Company 1	Feb. 24	15.30
Des Moines Dairy Company 5	Feb. 24	15.50
E. B. Dunne 1	Feb. 21	21.00
E. B. Dunne 2	Feb. 21	21.00
J. Cruickshank	Feb. 21	17.40
F. West	Feb. 21	20.70
Bragdon Bros	Feb. 24	14.40
F. G. Patton	Feb. 24	19.50
M. E. Young	Feb. 24	17.10
H. Pickering	Feb. 24	21.60
F. M. Blackman	Feb. 24	13.80
G. T. Schlencker	May 21	18.00
W. O. Howell	May 21	18.90
W. Stubbs	May 21	20.40

NAME OF DEALER.	Date of test.	Test.
Des Moines.		
E. B. Young	May 21	18.60
E. B. Young	May 25	12.60
W. H. Thomas	May 24	21.30
W. H. Thomas	May 24	16.50
J. R. Wilson 1	March 19	16.50
J. R. Wilson 3	May 25	15.50
Iowa Dairy Company 1	May 25	19.80
Iowa Dairy Company 2	May 25	22.80
W. Stubbs	May 19	19.50
W. F. Carter	May 26	21.00
W. F. Carter	May 26	20.10
Iowa Dairy Company 2	June 25	20.10
L. J. Van Der Linden	June 22	18.50
F. West	June 30	18.00
J. P. Van Stuben	June 19	17.50
Bragdon Bros. 1	July 25	18.00
Bragdon Bros. 2	Aug. 20	19.60
A. W. Harding	July 28	18.60
G. W. Felt	Aug. 20	21.00
A. Terry	Sept. 21	18.30
Terry & West	Oct. 14	17.10
F. West	Aug. 20	19.50
Sioux City.		
A. O. Woodcock	Aug. 14	16.20
Marshalltown.		
E. Winschell	July 25	22.00
Varnum Bros	Sept. 25	17.40
Fort Madison.		
W. B. Smith	Aug. 11	15.00
W. B. Smith	Sept. 23	16.60

Total number tests, 59; average of all tests, 18.84.

DEPOTS AND STORES.

One particular feature of the city milk trade which has developed in the past year is the rapidly increasing number of depots where milk is sold. There are many families in the larger cities who do not find it convenient to receive their supply of milk at a certain time every day. For the accommodation of this class, dealers established depots at different points along their route, from which milk may be bought at any time of the day or evening. Previously, bakeries and restaurants were the principal depots, but in the past year they may be found in meat markets and grocery stores as well. The trade in this particular has increased and proven popular, insomuch that merchants themselves have established departments where milk is sold in their stores or their markets. Each depot has a permit for the sale of milk, as required by law. One of the strong indications of increase in this traffic has been shown in the number of permits issued.

INFORMATION PERTAINING TO CITY MILK SUPPLY.

Following is a table of information compiled from blanks received by this department in the form of applications for permits from city milk dealers. This table shows the number of wagons and depots operated in each city; the manner of distributing milk, and the number selling skimmed milk and cream; the number of families, hotels, restaurants, etc., supplied by city milk dealers; the yearly value of all milk sold; number and grade of cows from which the city milk supply is taken; total number of cows in each city, together with the yearly average per cow. Since this table is compiled by cities, the direct information as pertains to each city is given:

CITY.	Census of 1895, population.	PERMITS ISSUED FOR YEAR ENDING JULY 4, 1897.			MANNER OF DISTRIBUTING MILK.			KIND OF MILK SOLD.			Number of persons employed.	NUMBER OF FAMILIES, HOTELS AND RESTAURANTS SUPPLIED.		Yearly value of milk sold.	NUMBER DIFFERENT BREEDS OF COWS FROM WHICH MILK SUPPLY IS OBTAINED.								Yearly average per cow.
		Wagons.	Depots.	Total.	Dipped or poured from cans.	Drawn from faucet in cans.	Delivered in small individual cans, jars or bottles	Whole milk.	Cream.	Skimmed milk.		Private families.	Hotels, restaurants, etc.		Jerseys.	Grade Jerseys.	Holsteins.	Grade Holsteins.	Shorthorns.	Grade Shorthorns.	Common or not given.	Total of all breeds.	
Burlington	25,246	33	12	45	33	1	11	45	23	18	83	4,169	23	$ 66,912	79	87	29	53	7	79	431	765	$87.40
Cedar Rapids........	21,555	40	8	48	33	....	9	48	27	24	80	3,417	39	54,480	71	73	45	53	5	186	203	635	85.79
Clinton..............	23,377	34	4	38	32	1	8	38	6	2	69	1,235	47	43,276	67	29	32	12	45	55	357	597	72.85
Council Bluffs.......	20,189	31	2	33	27	1	8	33	20	14	53	1,772	49	41,486	48	10	30	13	47	82	241	470	94.60
Davenport...........	30,010	67	8	75	56	1	12	75	39	26	111	5,416	75	91,022	71	54	59	15	40	101	744	1,084	83.97
Des Moines..........	56.859	81	29	110	30	31	6	110	67	59	129	6,853	138	138,140	58	135	183	171	77	227	580	1,431	96.58
Dubuque	40,574	46	10	56	13	24	8	56	20	15	103	4,757	61	78,624	82	25	21	11	46	57	712	954	82.42
Fort Madison........	10,023	12	2	14	11	1	....	14	7	3	28	1,393	11	19,416	5	31	....	6	5	38	153	238	81 60
Keokuk..............	14,287	19	......	19	......	16	....	19	....	8	42	1,791	68	35,532	86	32	22	18	22	27	119	326	108 93
Marshalltown.......	10 049	10	2	12	8	2	7	12	10	8	30	1,381	26	21,540	9	44	4	25	32	50	49	213	101.12
Muscatine...........	12,237	13	2	15	......	11	....	15	....	7	33	1,183	16	22,153	56	54	13	25	....	26	81	255	86.87
Ottumwa	16,761	17	. ...	17	12	....	....	17	....	5	45	1,871	52	36,720	8	62	7	105	67	79	58	386	95.10
Sioux City...........	27,871	50	3	53	28	21	3	53	25	13	80	1,423	75	63,552	40	70	36	73	70	76	312	677	94.00
Total	308,037	453	82	535	278	110	63	535	278	202	888	36,667	580	$ 712,802	680	706	481	579	463	1,083	4,039	8,031	$88.75

From this table it will be seen that the cities under the milk inspection system, have a population of more than 300,000 people, about one-seventh of the whole population of the state. The people are supplied by 535 licensed dealers and are classified as follows: Number of wagons from which milk is sold, 453; depots and stores, 82. There are 36,667 families and 580 hotels and restaurants supplied with milk from wagons; the sales from depots are generally transient, and the customers can not be counted upon as regular. There are 888 persons reported employed in the dairy business, at the dairy farm and elsewhere, in connection with the sale and production of milk for the thirteen cities under control of this department. The value of milk sold for the year ending June 30, 1896, is reported to be $713,802.

The number of cows supplying milk for the city patrons is 8,031; 50 per cent of these are reported as common grade cows or breed not reported: 20 per cent are Shorthorn, 17 per cent Jersey and 13 per cent Holstein. The cows belonging to the milk dealers of the city of Keokuk yield $108.93 per head, the largest of any of the 13 cities. The smallest yield, $72.85 per head, is reported by the dealers of Clinton. The average returns for the 8,031 cows is $88.75.

The business of supplying milk to the city trade is reasonably profitable, and the class of men engaged in this business in our cities are good citizens and show a commendable spirit toward the law. They realize the better the quality of milk, the more will be its use. In the report last year we advocated licenses of a higher rate than is now in force, for city milk dealers, which with the increased revenue will pay the expense of a carefully devised system of inspection of everything connected with the business, from the cow, her home and her surroundings, to the delivery of her product to the consumers. This is the right plan to carry out, and we trust that it may be accomplished before many more reports have been issued from this office. Give the people of Iowa this kind of protection and milk that is as rich in quality as it now is, and they will have nothing to complain of along that line.

The manner of delivering milk from either the dairy direct, or from the whole supply as carried by the dealer in his wagon, has been improved from year to year by the introduction of new utensils. Among these we find that glass jars have become more or less desired for the delivery of milk, and when well filled with fresh milk, may be delivered to the customer unopened from the time it left the dairy, and free from churning or dust, or other disagreeable substances, thereby adding to its purity when ready for use. By the use of glass jars there is some risk of contracting and spreading disease, unless the most scrupulous care is taken to thoroughly wash and cleanse jars when emptied each day. In some cases paper corks are used, and ofttimes more than once. This is one objection to the use of the paper cork, for after being used once it is not fit for a second time.

LIST OF CITY MILK DEALERS.

Following is a tabulated list of all milk dealers in the state of Iowa having permits for the yarse ending July 4, 1896 and 1897. The cities and the names of dealers are arranged alphabetically. This table shows the manner of selling milk, total number of tests had during the year, the highest test, lowest test, average test, and the number, if any, below standard.

BURLINGTON.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
1	Bentz, George	Depot	......	451	2	4.00	3.80	3.90	....
2	Binder Bros	Wagon	307	11	18	4 00	3.00	3.62	....
3	Binder, Thomas	Wagon	308	186	20	4.20	3.00	3.66	....
4	Boecher, H	Depot	......	439	2	5.20	3.60	4.40	....
5	Bowman, H. C	Wagon	310	496	20	4.00	2.80	3.60	1
6	Brooks, H. E	Wagon	......	......	1	5.10	5.10	5.10	....
7	Buhrmaster, F. W	Wagon	......	......	2	5.00	4.60	4.80	....
8	Chester, C. F	Wagon	431	514	10	6.00	3.60	5.20	....
9	Dailey, C	Wagon	309	4	14	5.20	3.20	3.75	....
10	Davis, M. H. & Co	Depot	......	518	......	......	......	......	....
11	Duckstein, F	Wagon	126	325	9	4.20	2.40	3.48	1
12	Eggleston, C	Depot	......	429	2	5.20	3.50	4.35	....
13	Enzler, C	Store	......	346	1	3.60	3.60	3.60	....
14	Ernst, F	Wagon	152	184	11	3.90	3.00	3.46	
15	Ernst, C. G	Wagon	316	410	27	4.40	3.40	3.75	....
16	Grabenkamp, F	Store	125	5	18	5.00	3.20	3.60	...
17	Glickson, M	Store	......	486	2	7.00	3.70	5.35	....
18	Hacker, A	Wagon	276	9	16	4.10	3.00	3.60	....
19	Hall's Jersey Dairy	Wagon	......	465	3	5.60	4.50	5.03	....
20	Hartman, K	Store	......	345	1	4.00	4.00	4.00	....
21	Haskell, O. L	Wagon	428	70	5	5.20	4.00	4.80	....

BURLINGTON—CONTINUED.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
22	James, Joe	Wagon	261	419	19	4.00	3.00	3.70	....
23	Johnson, O.	Wagon	498	8	9	4.00	3.20	3.73	....
24	Johnson, H.	Wagon	......	......	1	4.00	4.00	4.00	....
25	Kestner, H. C.	Wagon	259	405	13	5.00	3.20	4.00	....
26	Klien, C.	Wagon	....	......	1	4.50	4.50	4.50	....
27	Leak, George S.	Wagon	427	452	9	5.20	3.00	3.82	....
28	Leak, H. D.	Wagon	287	3	14	4.40	3.00	3.80	....
29	Lenti, A.	Wagon	......	515	5	4.00	3.10	3.60	....
30	Lichtenburg, F.	Wagon	185	1	12	4.30	3.40	3.90	....
31	Lindholm, H.	Depot	......	513	......	......	......	......	....
32	Merlahan, D.	Depot	......	389	2	4.20	3.00	4.80	....
33	Newman, George	Wagon	481	......	......	......	.....	......	....
34	Parsons, F. M.	Wagon	19	448	20	5.20	3.60	3.90	....
35	Pierson, A.	Wagon	......	......	1	4.10	4.10	4.10	....
36	Pratt, Charles	Wagon No. 1.	34	6	20	5 20	3.60	3.90	..
37	Pratt, Charles	Wagon No. 2.	......	7	19	4.00	3.00	3.70	....
38	Runge, E	Wagon	306	......	7	6.00	3.00	4.10	....
39	Schupp, J. W	Store	......	485	2	5.20	5.00	5.10	....
40	Schwacker, C.	Depot	......	487	2	4.40	4.20	4.30	....
41	Smith, E. H	Wagon	.....	488	2	4.20	3.80	4.00	....
42	Sommerfield, W.	Depot	......	488	2	3.50	3.20	3.35	....
43	Sourine, B.	Wagon	35	2	18	4.20	3.00	3.75	. ..
44	Sutton, M. C.	Wagon	......	......	2	5.10	4.90	5.00	....
45	Swords, E. J.	Wagon	165	256	16	4.20	3.00	3.60	....
46	Tennity, E. J.	Wagon	499	502	16	4.10	3.00	3.62	....
47	Upton, J. C.	Depot	......	428	2	4.30	4.00	4.20	....
48	Van Winkle, O. G.	Wagon	58	344	25	4.20	3.00	3.62	....
49	Vaughan, S. T.	Wagon	270	326	18	4.60	3 20	3.75	....
50	Vogelsang, H.	Wagon	245	472	18	4.40	3.00	3.60	....
51	Wotten, J. T.	Wagon	517	10	5	5.40	4.00	4.80	....
52	Woodward, S. H	Wagon	360	491	......	......	......	......	....
53	Wuellner, F.	Wagon	325	185	7	4.20	3.70	3.96	....
	Total	....	......	......	462	5.40	3.08	3.84	2

CEDAR RAPIDS.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
1	Alt, L. W	Wagon	.....	531	.....	.....	.....	.....	....
2	Bear, W. T. S	Wagon	.....	382	5	4.80	4.40	4.60	....
3	Berry & Bear	Wagon	97	100	9	4.60	3.40	4.10	....
4	Berry & Bear	Wagon	.....	101	.....	.....	.....	.....	....
5	Bevins, S. A	Wagon	.....	.....	1	4.40	4.40	4.40	....
6	Bremer, F	Wagon	52	102	6	4.80	3.80	4.37	....
7	Bremes, J. F	Wagon	301	376	3	4.20	3.40	3.80	....
8	Brock, R. E	Wagon	99	166	7	4.80	3.80	4.37	....
9	Buck, Carl	Wagon	.....	461	3	4.20	3.60	4.00	....
10	Bunger, E. W	Wagon	100	98	10	5.40	3.20	4.34	....
11	Calder, L B	Wagon	403	54	11	4.40	3 00	4.02	....
12	Clarke, Jas	Wagon	72	225	16	4.60	3.60	4.10	....
13	Crowe, S. R	Wagon	367	.....	2	4.40	4.20	4.30	....
14	Crowe, H. L	Wagon	.....	415	.....	.....	.....	.....	....
15	Davis, C. H	Wagon	469	340	7	5.00	3.00	4.03	....
16	Dockery, A	Depot	.....	506	3	4.80	4.20	4.50	....
17	Garmon, G. H	Wagon	520	481	8	4.60	3.20	4.02	....
18	Hawkins, H	Wagon	.....	483	1	5.00	5.00	5.00	....
19	Helbig, H. A	Wagon	377	309	9	4.80	3.70	4.10	....
20	Kilmeyer, F	Wagon	94	213	5	4.40	3.80	4.10	....
21	Kitterman, J. S	Wagon	129	97	11	5.60	3.80	4.70	....
22	Klinger, V	Wagon	369	35	10	4.80	3.40	4.06	....
23	Koutney, J	Wagon	95	167	11	4.80	3.20	4.10	....
24	Lewis, H	Wagon	526	.....	.....	.....	.....	.....	....
25	Leusch, W	Wagon	88	.....	9	4.60	3.00	3.70	....
26	Ling, A	Wagon	331	279	4	4.60	4.40	4.45	...
27	Listenbarger, I. G	Wagon	.....	48	6	5.20	4.40	4.60	....
28	McDowell, E. E	Wagon	158	133	15	4.80	3.00	4.28	....
29	Mergo, Geo	Wagon	468	.....	13	5.00	3.00	4.10	....
30	Miller Bros	Wagon	51	74	11	4.60	3.80	4.20	....
31	Milnes, J. C	Wagon	385	388	11	4.60	3.40	4.08	....
32	Pisney, F	Wagon	458	251	8	5.00	3.40	4.10	....
33	Parks, G. W	Store	.....	131	7	5.00	4.00	4.48	....
34	Patman, Geo	Wagon	.....	361	.....	.....	.....	.....	....
35	Porter, J. S	Wagon	216	295	13	5.60	3.80	4.40	....
36	Putman, W. J	Store	205	.....	2	4.40	4.00	4.20	....

CEDAR RAPIDS—CONTINUED.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
37	Richmond, E	Wagon	91	17	6	5.00	4.00	4.80	....
38	Rawson, J. B	Wagon	.....	474	4	4.20	3.80	3.90	....
39	Reynolds, D. W	Wagon	......	99	5	5.40	4.00	4.76	....
40	Robb Bros	Wagon	288	248	20	4.60	3.20	4.10	....
41	Smith, A. H	Wagon	83	......	1	4.00	4.00	4.00	....
42	Smith, H. G	Wagon	128	......	12	4.60	3 40	4.20	....
43	Sloan Bros	Wagon	......	470	......	......	......	......	....
44	Stewart, F. C	Wagon	......	......	2	4.40	4.00	4.20	....
45	Strakota, Mrs. A	Depot	504	......	4	6.00	3.00	4.40	....
46	Taft, C	Wagon	244	......	3	3.80	3.00	3.30	....
47	Thompson, C	Wagon	196	182	5	4.80	3.60	4.10	....
48	Trainor, D	Wagon	......	......	1	5.00	5.00	5.00	....
49	Umbdenstock, W	Wagon	251	365	7	4.60	3.00	3.90	....
50	Usher, J. S	Wagon	189	388	13	6.00	3.20	4.60	....
51	Upp, C. S	Wagon	533	......	4	4.00	3.00	3.75	....
52	Victorum, J	Wagon	89	......	1	4.00	4.00	4.00	....
53	Wendler, T	Wagon	......	484	2	4.40	4.20	4.30	....
54	Wilant Bros	Wagon	......	501	2	4.00	3.00	3.50	....
55	Willey, W	Wagon	381	......	......	......	......	.....	....
56	Williams Bros	Wagon	87	310	9	5.00	3.80	4.35	....
57	Wohen, J	Store	92	356	8	4.60	3.60	4.20	....
	Total	......	......	......	350	4.70	3.67	4.16	....

CLINTON.

1	Assenmaker, G	Wagon	229	......	3	4.40	3.80	4.13	....
2	Bach, John	Wagon	115	447	12	3.80	3.20	3.62	....
3	Baer, John	Wagon	376	396	14	4.40	3.00	3.80	....
4	Baker, J. P	Depot	356	237	18	4.30	3.00	3.40	....
5	Boynton, O. L	Wagon	23	259	26	5.60	3.00	3.80	....
6	Capion, O. F	Wagon	210	273	18	4.50	3.10	3.58	....
7	Carpenter, P	Wagon	342	324	9	4.00	3.50	3.70	...
8	Claussen, R	Wagon	200	130	13	4.00	3.20	3.58	....
9	Clinton Cream Depot	Depot	......	519	1	4.00	4.00	4.00	....
10	Everman, H	Wagon	286	392	13	4.60	3.00	3.70	....
11	Fanger, H	Wagon	375	459	13	3.80	3.20	3.40	....

CLINTON—CONTINUED.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
12	Freda, M. C.	Depot	197	227	12	4.40	3.30	3.80	....
13	Fritz, F.	Wagon	......	......	1	3.50	3 50	3.50	....
14	Gertzen, D.	Wagon	228	281	13	5.20	3.60	3.90	....
15	Gideonson, J.	Wagon	429	276	13	4.00	3.20	3.75	....
16	Haring, W. G.	Wagon	29	213	13	4.80	3.00	3.75	...
17	Heath & Stockwell	Wagon	258	103	13	4.20	3.00	3.76	....
18	Johnson, Nels	Wagon	220	71	13	4.20	3 10	3.60	....
19	Johnson, Gus	Wagon	278	226	9	3.90	3.10	3.64	...
20	Klinge, T. C.	Wagon	323	420	13	4.20	3.10	3.78	....
21	Kennedy, J. J.	Wagon	......	403	5	4.50	3.70	4.14	....
22	Krogman, F.	Wagon	516	289	8	4.00	3.00	3 54	....
23	Leitz, F.	Wagon	213	......	11	4.30	3.00	3.70	....
24	Miller, M. C.	Wagon	211	328	13	5.40	3.40	4.10	....
25	Morrisey, C.	Wagon	430	397	13	4.20	3.30	3.76	....
26	Nissen, C.	Wagon	363	294	13	4.40	3 00	3.74	....
27	Nielson, C.	Wagon	525	245	8	5.00	3.50	4 30	....
28	Oleson, S.	Wagon	114	104	13	4.20	3.00	3.80	....
29	Oleson, J. S.	Wagon	240	228	13	5.00	3.20	4.10	....
30	Paulson, C.	Wagon	93	171	13	4.70	3.00	3.60	....
31	Person, N.	Wagon	284	106	12	4.40	3.00	3.50	....
32	Peterson, C.	Wagon	320	339	10	4.20	3 20	3.86	....
33	Peterson, H. T.	Wagon	......	277	4	4.00	3.60	3.80	....
34	Rasmussen, F.	Wagon	......	......	1	3.70	3.70	3.70	....
35	Salisbury, N. L.	Wagon	......	371	1	4.30	4.30	4.30	....
36	Schmidt, P.	Wagon	18	105	11	3.90	3.00	3.40	....
37	Seesor, Charles	Wagon	280	243	13	4.40	3.30	3.80	....
38	Shirk, E. E.	Depot	521	433	9	4.70	3.00	3.65	....
39	Simmons, S.	Wagon	212	238	13	5.50	3.40	4.20	....
40	Thompson, C.	Wagon	432	352	7	4.40	3 00	3.90	....
41	Wilson, P. & Co.	Wagon	349	457	......	......	......	......	....
	Total		......	......	421	4.37	3.23	3.77	...

COUNCIL BLUFFS.

Number.	NAME.	Manner of selling milk.	Permit number —1895	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
1	Arnold, P. J.	Wagon	332	313	28	4.20	3.50	3.92	....
2	Baker, W. W.	Wagon	157	234	18	4.40	3.20	3.80	...
3	Cheeseborough, C. J.	Store	535	......	......	......	.....	......	....
4	Cook & Co.	Store	......	13	1	3.10	3.10	3.10	....
5	Droge, H	Wagon	492	......	14	4.40	3.60	3.96	....
6	Easdale, E.	Wagon No. 1.	291	158	29	4.30	3.00	3.78	....
7	Easdale, E.	Wagon No. 2.	358	159	29	4.20	3.00	3.80	...
8	Ellsworth, J.	Wagon	292	316	29	4.60	3.20	3.84	....
9	Ellsworth, A. C.	Wagon	542	315	15	4.60	3.30	4.12	....
10	Erickson, A. S.	Wagon	68	161	19	5.00	3.60	4.36	....
11	Green, Chas.	Wagon	359	390	20	4.60	2.80	3.44	1
12	Harding, G. J.	Wagon	......	12	1	3.50	3 50	3.50	....
13	Johnson Bros.	Wagon	262	233	19	4.50	2.80	3.89	1
14	Johnson, S.	Wagon	70	160	25	4.60	3.20	3.86	....
15	Lavenburg, A.	Wagon	......	75	28	4.40	2 80	3.80	1
16	Leonard, H.	Wagon No. 1.	384	377	20	4.10	2.80	3.74	1
17	Leonard, H.	Wagon No. 2.	......	479	2	4.00	3.20	3.60	....
18	Leonard, H.	Depot 3.	......	480	2	4.40	3.50	3.90	....
19	Letner, C. F.	Wagon	543	317	14	4.60	3.20	3.70	....
20	Lewis, N. & Son	Wagon	......	......	12	3.60	3 50	3.89	....
21	Martin, H. H.	Wagon No. 1.	302	301	26	4.20	3.40	3.98	....
22	Martin, H. H.	Wagon No. 2.	304	302	20	4.20	2.80	3.78	1
23	Marquette, Mrs. V.	Wagon	473	107	19	4.60	2.80	3 63	1
24	McCarthy, J. B.	Wagon	.....	458	3	4.20	3.60	3.80	....
25	McMullen, J. H.	Wagon	......	287	1	3.60	3.60	3 60	...
26	Millard, F. O.	Wagon	....	......	12	4.60	3.20	3 56	....
27	Murphy, Harry	Wagon	......	516	2	4.00	3.40	3.70	....
28	Nelson, P.	Wagon	253	214	17	4 20	3.10	3.68	....
29	Nelson, N. P.	Wagon	191	314	22	4.60	3.30	4.06	....
30	Pratt, O. F.	Wagon	501	318	16	4.20	3.20	3.80	....
31	Ray, Jas.	Wagon	203	312	19	4 80	3.50	4.00	....
32	Reid, A. H.	Wagon	295	467	15	4.00	2.50	3.64	1
33	Richardson, Mrs. J.	Wagon	413	....	......	......	......	......	....
34	Robinson, Mrs. M. M.	Wagon	201	53	15	5.60	4.30	5.20	....
35	Sherrer, Chas.	Wagon	204	215	7	4.80	3.60	3.96	....
36	Skodesholm, O.	Wagon	219	224	23	4.00	3.00	3.71	....

COUNCIL BLUFFS—CONTINUED.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
37	Stevens, Jas.	Wagon	410	......	8	4.20	3.80	4.00	....
38	Wiatt, J. & Co.	Wagon No. 1.	16	168	28	4.40	2.80	3.48	2
39	Wiatt, J. & Co.	Wagon No. 2.	......	169	1	4.20	4.20	4.20	....
40	Wiatt, J. & Co.	Depot	......	170	4	4.20	3.40	3.90	....
41	Wiatt, M. E.	Wagon	......	374	2	4.00	4.00	4.00	....
42	Waterloo Creamery Co.	Depot	149	......	18	4.20	2.80	3.78	1
	Total	......	......	.....	593	4.28	3.28	3.83	10

DAVENPORT.

1	Abraham, H. T.	Wagon	75	138	8	4.40	3.00	3.88	....
2	Aukerson & Haick	Store	485	263	6	3.80	3.50	3.65	....
3	Armil, J.	Wagon	194	291	4	4.00	3.60	3.80	....
4	Arp, Hans	Wagon	20	39	6	4.50	3.70	3.97	....
5	Baker, Frank	Wagon	490	350	7	4.00	3.00	3.50	....
6	Bargholtz, J.	Wagon	67	196	13	4.10	3.40	3.63	...
7	Barraclough, G.	Wagon	479	344	6	4.40	3.40	3.92	....
8	Berger, F. E.	Wagon	......	489	......	......	......	......	....
9	Beyer, B.	Depot	103	40	4	4.20	3.60	3.95	....
10	Bertram, P. H.	Wagon	532	......	1	4.00	4.00	4.00	....
11	Blumer Bros.	Wagon	63	82	11	3.90	3.20	3.60	....
12	Booth, O. H.	Wagon	27	47	10	4.40	3.60	3.78	...
13	Bruhn, H	Wagon	236	193	7	4.20	3.40	3.80	....
14	Bruhn, L	Depot	......	3 8	10	4.00	3.40	3.70	....
15	Carsterson, A	Wagon	......	504	......	......	.....	....	.. .
16	Christenson, C.	Wagon	391	81	8	4.00	3.20	3.80	....
17	Couglin, Thos.	Wagon	58	36	12	6.00	3.70	4.24	....
18	Cowiezell, J	Wagon No. 1	207	261	11	4.20	3.30	3.78	....
19	Cowiezell, J.	Wagon No. 2	205	262	5	4.00	3.60	3.72	....
20	Cowiezell, Jacob	Wagon	......	411	10	4.80	3.00	3.88	....
21	Dismer, W..	Wagon	385	323	10	4.60	3.30	3.63	....
22	Drier, F.	Wagon	510	407	8	3.90	3.30	3.66	....
23	Eckstrien, F.	Wagon	......	......	6	3.60	3.20	3.43	....
24	Eggers, Hans	Wagon	......	......	4	4.00	3.60	3 82	....
25	Einfeldt, E.	Wagon	342	......	......	......	......	....	....
26	Fellows, John	Wagon	......	......	1	3.20	3.20	3.20	....

DAVENPORT—CONTINUED.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
27	Fleming, P. H	Wagon	445	184	8	4.40	3.40	3.82	....
28	Gerdes, John	Wagon	502	264	2	3.70	3.60	3.65	....
29	Gankler, John	Wagon	317	135	5	4.00	3.40	3.70	....
30	Gankler, Joe	Depot	......	136	9	4.40	3.50	3.95	....
31	Goetsch, H. J	Depot	107	110	6	4.20	3.80	4.00	....
32	Harnes, H	Wagon	426	258	10	4.20	3.50	3.90	....
33	Hasse, H	Wagon	394	62	12	4.50	3.60	3.90	....
34	Harrison, J. W	Wagon	153	58	8	4.30	3.20	3.76	....
35	Hemmings, Mrs. D	Depot	256	441	5	4.10	3.60	4.00	....
36	Hener, John	Wagon	49	82	10	3.80	3.50	3.67	....
37	Hener, Claus	Wagon	102	76	10	3.80	3.40	3.68	....
38	Herriman, H. C	Wagon	289	529	7	4.20	2.40	3.51	1
39	Hinselman, H	Wagon	435	197	8	4.40	3.30	3.71	....
40	Howell & Prinz	Wagon	46	......	6	4.00	3.40	3.75	....
41	Juergenson, J	Wagon	166	128	12	4.40	3.00	3.86	....
42	Kelling, F	Wagon	103	257	7	4.00	3.70	3.93	....
43	Kellogg, H	Wagon	48	254	6	4.80	4.00	4.30	....
44	Koch, John	Wagon	235	368	12	4.00	3.40	3.82	....
45	Laible, J. F	Depot	509	404	6	4.00	3.50	3.65	....
46	Lange, J	Wagon	209	191	7	4.00	3.60	3.84	....
47	Larson, A	Wagon	514	57	5	4.20	3.40	3.84	....
48	Maves, John	Wagon	206	......	8	4.70	3.00	3.74	....
49	Mess, Henry	Wagon	21	300	7	4.20	3.30	3.81	....
50	Moffat, G. A	Wagon	......	......	1	3.80	3.80	3.80	....
51	Mueller, A.	Wagon	512	384	11	4.40	3.40	3.85	....
52	Nagel, H	Wagon	285	306	16	4.00	3.50	3.80	....
53	Neuman, E. H	Wagon	......	473	1	3.40	3.40	3.40	....
54	Nichols, Mrs. J. C	Wagon	437	119	3	3.40	3.20	3.30	....
55	Peterson, P	Wagon	425	351	9	4.80	3.20	3.92	....
56	Peterson, Hans	Wagon	532	192	1	3.40	3.40	3.40	....
57	Prignitz, A	Wagon	478	194	9	4.00	3.40	3.73	....
58	Prinz, Charles	Wagon	......	375	5	3.70	3.40	3.55	....
59	Raum, Max	Wagon	198	137	10	4.20	3.50	3.79	....
60	Rissman, C	Wagon	106	......	2	3.50	3.40	3.45	...
61	Roundy, P. W	Wagon	......	64	1	5.10	5.10	5.10	....
62	Ruch, P	Wagon	47	108	10	4.20	3.40	3.83	....

DAVENPORT—CONTINUED.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
63	Ruchman, O	Wagon	386	236	13	3.90	3.20	3 60	....
64	Schladitz, A	Wagon	395	78	13	4.40	3.00	3.72	....
65	Schmidt, John	Wagon	10	18	8	4.70	3.40	3.75	....
66	Schnoor, O	Wagon	50	37	10	4 50	3.80	4.05	....
67	Schrumer, M	Wagon	265	297	12	3.80	3 20	3.50	....
68	Severston, C. F	Wagon	195	242	8	4.70	3.40	3.75	....
69	Springhorn, P	Wagon	326	466	7	3.80	3.40	3.63	....
70	Steer, F	Wagon	317	.....	3	4.30	3.40	3.83	....
71	Thiessen, P	Wagon	218	241	11	4.50	3.80	4.00	....
72	Timon, John	Wagon	513	414	8	3.90	3.30	3.53	...
73	Waage, M	Wagon	.....	307	......	......	.....	.....	....
74	Wallk, John	Wagon No. 1.	28	79	8	4 20	3.40	3.95	....
75	Wallk, John	Wagon No. 2.	.....	80	......	......	......	......	....
76	Weise, R	Wagon	......	286	1	3.40	3.40	3.40	....
77	Wendlehausen, H	Wagon	106	127	8	4.00	3.30	3 61	....
78	Willers, H	Wagon	237	195	7	4.20	3.30	3.61	....
79	Wolff, W. W	Depot	......	520	1	3.80	3.80	3.80	....
80	Zarn & Fambo	Wagon	241	109	9	4 10	3 40	3.72	...
81	Zinger, George	Wagon	44	329	1	4.50	3.40	3 70	....
	Total	....		.....	562	4 17	3.40	3.77	1

DES MOINES.

1	Altman, T. G	Wagon	281	.....	2	3.80	3.60	3 70	....
2	American Dairy	Wagon	.....	......	2	3.40	3.40	3.40	....
3	Anderson, A	Wagon	559	80	2	4.10	4.10	4.10	....
4	Arthur, R. C	Wagon	148	160	13	5.10	3.30	4.00	....
5	Berger, H	Wagon	......	303	......	......	.....	.....	...
6	Bennett, R. S	Wagon	......	427	4	4.60	4.50	4.52	...
7	Bentrip, O. W	Wagon	528	150	12	5.00	2.50	3.90	1
8	Blackman, F. M	Wagon	172	52	11	4.50	3.70	4.15	...
9	Breeding, G. J	Store	136	. ....	......	.....	.....	.....	...
10	Burke, U. J	Store	181	.....	11	4.30	3.00	3.78	.
11	Borgenson, A	Wagon	.....	....	2	3.70	3.60	3.65	...
12	Brown & Monteith	Store	138	395	9	4.80	3.10	3 59	.
13	Bragdon Bros.	Wagon No 1.	321	58	15	4.30	3.40	3 90	.

DES MOINES—CONTINUED.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test	Number below standard.
14	Bragdon Bros	Wagon No. 2.	323	84	13	4.50	3.40	3.95	....
15	Campbell, E	Wagon	131	290	11	4.00	3.10	3.61	....
16	Churchman, W. W	Wagon	66	153	9	6.20	4.30	4.67	....
17	Calkins, O. H	Wagon	......	......	1	5.80	5.80	5.80	....
18	Carden, George F	Wagon	......	416	1	5.10	5.10	5.10	....
19	Carter, W. F	Wagon	524	288	10	4.60	3.40	4.09	...
20	Cohen, N. B	Wagon	483	......	8	4.50	3.40	4 06	....
21	Clark, H. S	Depot	137	179	9	5.20	3.00	3.65	....
22	Cruickshank, J	Wagon	132	342	16	4.70	3.60	4.00	....
23	Denny, J	Wagon	......	493	.....	.....	......	.....	....
24	Des Moines Dairy Co	Wagon No. 1.	77	19	16	5 20	3.20	3.86	....
25	Des Moines Dairy Co	Wagon No. 2.	78	20	17	5.10	3.40	4.12	....
26	Des Moines Dairy Co	Wagon No. 4.	79	21	12	4.60	3.30	3.88	....
27	Des Moines Dairy Co	Wagon No. 5.	80	22	15	6.10	3.10	4.00	....
28	Des Moines Dairy Co	Wagon No. 6.	......	23	......	......	......	......	....
29	Des Moines Dairy Co	Depot	76	24	24	5.60	3.10	3.82	....
30	DeVore, J. E. & Co	Store	378	......	10	4.80	3.20	3.83	....
31	Dippell, L	Store	518	154	5	3.70	3.20	3.44	....
32	Dunne, E. B	Wagon No. 1.	398	14	5	4.40	3.50	3.83	....
33	Dunne, E. B	Wagon No. 2.	......	15	5	4.40	3.40	3.80	....
34	Dunne, E. B	Depot	.....	16	5	4.50	3.40	3.83	....
35	Ehle & Ehle	Depot	226	181	9	5.40	3.30	4.20	....
36	Erb, Charles	Wagon	......	494	......	......	......	......	....
37	Fagolle & Harris	Store	454	425	10	4.70	2.60	3.70	1
38	Falbo, P	Store	282	......	5	4.30	3.70	3.96	....
39	Felt, G. W	Wagon	311	331	11	4.70	3.50	4.16	....
40	Fitzgerald, Kate	Wagon	......	468	3	7.30	4.80	6.20	....
41	Flook, W. A	Wagon	....	512	......	......	......	......	...
42	France, E. M	Store	371	398	7	4.10	3.40	3.80	....
43	France, L. E	Store	......	......	2	4.10	3.40	3.75	....
44	Geil, F. M	Wagon	366	190	9	4.40	3.60	4.04	....
45	Gordon, William	Store	175	327	9	4.40	3.30	3.90	....
46	Graham, M. J	Store	42	319	9	4.70	3.10	3.82	....
47	Harliss, F. O	Wagon	......	469	......	......	......	......	....
48	Hawks Bros	Store	246	517	10	4.70	3.50	3.96	....
49	Harding, A. W	Depot	390	399	11	4.80	3.00	3.86	....

DES MOINES—CONTINUED.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
50	Hockersmith J. S	Store	389	149	6	4.00	3.20	3.50	....
51	Harrison, S. C	Wagon	......	423	... ..	......	......	......	....
52	Hervey, Wm	Wagon	505	129	......	.....	......	......	....
53	Howells, W. C	Wagon	293	55	14	4.20	3.00	3.88	....
54	Huntoon, H. M	Wagon	......	......	5	4.00	3.60	3.83	....
55	Hawkeye Milk Co	Wagon	......	499	2	4.80	4.40	4.60	....
56	Iowa Dairy Co	Wagon No. 1.	536	26	13	4.40	3.50	4.10	....
57	Iowa Dairy Co	Wagon No. 2.	537	27	2	3.50	3.30	3.40	....
58	Iowa Dairy Co	Depot	538	28	11	4.50	2.90	3.98	1
59	Johnson, C. R	Wagon	24	424	18	4.60	3.60	3.91	....
60	Jones, L	Wagon	.....	157	8	5.00	2.90	3.73	2
61	Kampinsky, J	Wagon	3	162	8	4.40	3.40	4.29	....
62	Kampinsky, J	Wagon	......	163	......	......	......	......	....
63	Lane, A. C	Wagon	65	118	2	3.60	3.40	3.50	....
64	Lowe, F. J	Depot	130	......	4	3.60	3.00	3.30	....
65	Lunn, D. J	Wagon	552	......	2	3.60	3.40	3.50	....
66	Malone, J	Wagon	......	......	2	4.10	3.50	3.80	....
67	Maple, M. C	Wagon	170	......	2	4.40	4.10	4.25	....
68	Markley, J. O	Wagon	373	......	......	......	......	......	....
69	McConnell Bros	Wagon	214	......	8	4.30	3.40	3.90	....
70	McKowan Bros	Wagon	312	......	11	4.20	3.60	4.00	....
71	McKowan, F. M	Wagon	......	500	6	4.40	3.10	3.86	....
72	Miller, M. J	Depot	365	435	7	4.30	3.60	3.81	....
73	Miller, M. H	Store	279	417	5	4.60	3.70	3.98	....
74	Monroe, M. E	Wagon	381	......	2	4.40	3.20	3.80	....
75	Moyer, J. C	Store	503	343	4	4.50	3.30	3.85	..
76	Moore, F. A	Store	476	216	9	6.20	3.50	4.57	....
77	Moore, J. E	Store	497	......	2	3.80	3.70	3.75	....
78	Mueller, J. M	Wagon	315	304	11	4.80	3.20	3.73	....
79	Oleson, J	Wagon	59	51	13	6.20	3.20	3.96	....
80	Page, G. D	Wagon	......	285	......	......	......	.....	....
81	Patton, H. A	Depot	141	173	10	4.60	3.00	3.89	....
82	Patton, F. G	Wagon	250	......	8	4.40	4.00	4.21	....
83	Paul, P	Store	387	......	2	4.40	4.30	4.35	.. .
84	Payton, W. W	Wagon	233	409	16	4.70	3.70	4.06	....
85	Peterson, P	Wagon	......	......	3	4.80	4.00	4.43	....

DES MOINES—CONTINUED.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
86	Pickering, H	Wagon	173	440	11	4.60	3.40	4.05	....
87	Pickering, O. B	Wagon	411	172	9	4.30	3.40	3.84	....
88	Proctor, Geo	Wagon	182	348	10	4.70	3.40	3.89	....
89	Pugh, Mrs. H. A	Depot	388	418	9	4.20	3.00	3.60	....
90	Quist, Frank	Wagon	558	266	2	3.90	3.60	3.75	....
91	Rhea, E. E	Wagon	412	......	1	4.00	4.00	4.00	....
92	Ring, F. M	Wagon	373	450	15	4.70	3.30	3.87	....
93	Rogers, R	Store	248	269	9	4.20	3.20	4.00	
94	Reynolds, Mrs. J. F	Store	......	.....	11	4.50	3.20	3.85	....
95	Redman, C	Wagon	551	......	4	4.50	3.60	4.00	....
96	Ricketts, W. E	Wagon	411	152	16	4.50	3.20	3.62	....
97	Robb, Geo. F	Wagon	......	......	3	3.60	3.10	3.45	....
98	Sanders, H	Store	247	391	9	4.60	3.00	3.80	....
99	Sanders & Johnson	Store	480	421	8	3.90	3.00	3.35	....
100	Sarchfield, J. P	Wagon	271	......	1	4.20	4.20	4.20	....
101	Schlencker, Charles	Wagon	374	......	3	4.00	3.50	3.80	....
102	Schlencker, George F	Wagon	98	31	12	5.40	3.40	3.94	....
103	Schoenfeldt, G	Wagon	264	443	7	3.80	3.00	3.35	....
104	Scott, A. W. & Co	Depot	177	268	9	4.50	3.20	3.93	....
105	Sideors, H. A	Depot	138	332	5	4.00	3.10	3.54	....
106	Smith, J. S	Wagon	375	147	11	4.60	3.10	3.93	....
107	Smith, Ed	Wagon	448	......	2	4.10	4.20	4.10	....
108	Smith, Mrs. M. G	Wagon	......	178	......	......	.....	......	....
109	Stitt, S. S	Wagon	227	......	5	4.30	3.30	3.88	
110	Stookey, D. M	Wagon No. 1.	176	155	16	4.50	3.40	3.93	....
111	Stookey, D. M	Wagon No. 2.	402	156	17	4.90	3.60	4.06	....
112	Stradley, W. W	Wagon	372	......	7	4.60	3.40	3.98	....
113	Stebbins, W	Wagon	355	......	3	4.40	3.50	3.96	....
114	Streckland, L. M	Wagon	169	284	16	5.80	3.00	4.10	....
115	Starks, J. H	Wagon	489	151	10	4.80	3.40	3.98	....
116	Starks, C. L	Wagon	444	267	14	4.60	3.40	3.96	....
117	Stubbs, William	Wagon No. 1.	134	174	9	5.40	3.50	4.10	....
118	Stubbs, William	Wagon No. 2.	......	175	9	4.50	3.30	4.05	....
119	Terry, M. M	Wagon	162	......	1	3.70	3.70	3.70	....
120	Terry & West	Wagon	41	364	4	3.90	3.50	3.70	....
121	Terry, George	Wagon	161	......	4	3.80	3.30	3.65	....

DES MOINES—CONTINUED.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
122	Terry, A	Wagon	39	454	9	4.20	3.20	3.86	....
123	Terry, A	Depot	40	455	8	4.20	3.30	3.80	....
124	Terry Bros	Wagon	......	......	1	3.90	3.90	3.90	....
125	Thomas, W. H	Wagon	477	462	12	4.90	3.10	3.58	....
126	Tyler, J	Wagon	187	164	11	4.20	3.90	4.00	....
127	Vail's Dairy Depot	Depot	239	430	5	4.50	3.40	4.08	....
128	Vail's Dairy Depot	Wagon	238	431	2	3.50	3.10	3.30	....
129	Van Der Linden, L. J	Depot	118	125	9	4 40	3.10	3.58	....
130	Von Stueben, J. P	Wagon No. 1.	404	423	11	5.50	3.90	4.20	....
131	Von Stueben, J. P	Wagon No. 2.	405	424	14	4.40	3.60	4.02	....
132	Welton, S. & Co	Store	539	246	6	4.60	3.50	3.96	....
133	West, O. P	Wagon	112	177	1	5.00	5 00	5.00	....
134	West, F	Wagon	139	176	14	4.70	3.40	3 81	....
135	Wessinger & Co	Store	383	408	8	4.40	3.20	3.73	....
136	Williamson, James	Wagon	340	......	1	4.10	4.10	4.10	....
137	Wilson & Co	Wagon	528	366	8	4.40	3.00	3.78	....
138	Wilson & Co	Wagon	529	367	8	4.00	3.60	3.80	....
139	Wilson & Co	Wagon	530	.....	4	4.50	3.40	4.00	....
140	Wilson & Co	Depot	531	......	3	3 60	3.00	3.30	....
141	Wilson, M. I	Wagon	......	... ..	1	4.30	4.30	4.30	....
142	Wilson, D. F. & Bro	Wagon	......	......	3	4.20	3.70	3.96	....
143	Wollbridge, F	Wagon	297	347	7	3.80	2.50	3.26	1
144	Wood, W. T	Store	199	449	7	4.20	3.40	3.77	....
145	Wormlesdorf, T. H	Store	60	400	10	4.60	3.20	3.85	....
146	Young Bros	Wagon	......	349	6	4.20	3.40	3.73	....
147	Young, E. B	Wagon	154	85	9	4.60	3.20	3.89	....
148	Young, M. E	Wagon	178	......	7	4.40	3.50	3.85	....
149	Zickafoos, W. C	Wagon	434	.....	2	4.10	4.00	4.05	....
150	Zim, D.	Store	140	330	7	4.40	3.20	3.98	....
	Total		......	......	1,064	4.26	3.45	3.96	6

DUBUQUE.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
1	Adam, M	Store	299	432	11	4.40	3.40	4.00	....
2	Albrecht, G.	Wagon	......	......	3	4.00	3.80	3.90	....
3	Avery, H. L	Wagon	......	464	2	3.80	3.20	3.60	....
4	Bahl & Kukch	Store	......	368	8	4.60	3.60	4.07	...
5	Barrett, John	Wagon	364	521	12	4.80	3.00	3.40	....
6	Bolzler & Bulow	Wagon	243	282	15	4.90	3.40	4.30	
7	Breedenbender, Mrs	Store	300	......	10	4.80	3.20	3.98	....
8	Breuke, C	Wagon	418	522	12	8.70	3.40	4.86	....
9	Buckingham, T.	Wagon No. 1.	267	336	6	4.40	4.00	4.20	....
10	Buckingham, T.	Wagon No. 2.	268	337	12	4.20	3.00	3.80	....
11	Carroll, T. B	Wagon	494	......	5	4.40	3.20	3.96	....
12	Conzett, A.	Wagon	277	298	10	5.00	4.00	4.48	....
13	Cushing Creamery Co	Wagon	420	509	14	4.30	3.40	3.90	....
14	Cushing Creamery Co	Wagon	421	510	13	4.40	3.20	3.94	....
15	Eagle Butter and Egg Co	Depot	32	......	......	......	......	......	....
16	Elgin, M.	Wagon	484	.....	6	4.20	3.80	4.00	
17	Enzler, Mrs. M	Store	508	292	8	4.30	3.80	4.02	....
18	Fleusch, J. & Son	Wagon No. 1.	352	120	10	4.20	3.00	3.80	....
19	Fleusch, J. & Son	Wagon No. 2.	350	121	9	4.50	3.20	3.76	....
20	Fleusch, J. & Son	Depot No. 1.	351	122	11	4.80	3.30	4.00	....
21	Fleusch, J. & Son	Depot No. 2.	......	123	10	5.00	3.20	3.92	...
22	Fleusch, J. & Son	Depot No. 3.	......	124	3	4.00	3.40	3.70	....
23	Fielan, C	Wagon	482	....	3	4.80	4.00	4.40	....
24	Ford, James.	Wagon	341	......	4	4.60	4.00	4.20	....
25	Gadient, John	Wagon	417	89	12	4.80	3.60	4.23	....
26	Gartner, A	Wagon	225	456	12	4.80	3.00	3.68	....
27	Getting, D. F. & Son	Wagon	493	.....	13	4.20	3.20	3.85	....
28	Hackers, A	Wagon	416	88	8	4.60	3.00	3.80	....
29	Heinne, E	Wagon No. 1.	146	......	10	4.60	3.60	3.98	....
30	Heinne, E	Wagon No. 2.	147	......	16	4.40	3.80	4.00	....
31	Herron, H. L	Wagon	292	247	10	5.20	3.60	4.00	....
32	Hoferlin J	Wagon	184	406	9	5.00	3.80	4.48	....
33	Hick, M	Wagon	507	......	6	4.80	3.40	4.52	...
34	Jecklin, J. H	Wagon No. 1.	190	45	10	5.00	3.40	4.00	....
35	Jecklin, J. H	Wagon No. 2	242	46	11	4.20	3.00	3.76	....
36	Knockle, A	Wagon	460	289	12	4.80	3.40	3.96	....

DUBUQUE—CONTINUED.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
37	McKinney, C	Wagon	439	......	6	4.20	3.80	4.00	....
38	Mettel Bros	Store	......	446	1	3.80	3.80	3.80	....
39	Meyer, H	Wagon	118	86	12	5.20	4.40	4.80	....
40	Meyer, H	Wagon	119	87	12	5.40	4.40	4.86	....
41	Miller, J. C	Wagon	......	370	2	4.00	3.80	3.90	....
42	Mueller, C	Wagon No. 1.	142	217	11	5.00	4.60	4.80	....
43	Mueller, C.	Wagon No. 2.	143	218	9	4.80	3.20	4.00	....
44	Mueller, C	Depot	.....	219	3	4.70	4.40	4.60	....
45	Murphy, J. J	Wagon	......	436	......	.....	......	......	....
46	Mussehl, F	Wagon	415	401	1	4.20	4.20	4.20	....
47	Ohrn Bros	Wagon	433	......	10	4.40	3.60	4.00	...
48	Paley, F	Wagon	327	508	5	4.40	3.20	3.62	....
49	Paley, A	Wagon	155	200	9	4.30	3.40	3.80	....
50	Park Grocery Co	Store	......	444	1	3.80	3.80	3.80	....
51	Pfoll, L. J	Wagon	495	508	1	4.00	4.00	4.00	....
52	Prysis, R	Wagon	108	198	6	4.20	3.80	4.00	....
53	Quinlan, John	Wagon	......	437	5	4.80	3.00	3.84	....
54	Runyan, G. H	Wagon	315	......	2	4.80	4.20	4.60	....
55	Schlegel, M	Wagon	474	......	13	4.40	3.20	3.80	....
56	Seeman, P	Wagon	37	199	9	5.00	3.80	4.40	....
57	Sheridan, B	Wagon	333	272	11	5.20	4.00	4.60	....
58	Spinetzky, A	Wagon	180	426	11	5.20	4.20	4.60	....
59	Supple, M. F	Depot	81	201	7	4.60	3.40	4.00	...
60	Sutter, L	Wagon	428	445	7	4.80	3.80	4.17	....
61	Thorman, G. A	Wagon No. 1.	296	393	10	4.20	3.20	3.93	....
62	Thorman, G. A	Wagon No. 2.	297	394	11	4.20	3.00	3.89	....
63	Thorman, G. A	Depot	298	395	9	4.20	3.80	4.02	....
64	Walker, C. H	Wagon	109	90	12	4.60	3.60	4.16	....
65	Weist, H	Wagon	414	......	3	4.60	4.00	4.40	....
66	Willard, A	Wagon	459	249	9	5.00	4.00	4.30	....
67	Ziegler, C	Wagon	424	56	8	4.60	3.60	4.02	....
	Total	....	......	.....	542	4.63	3.74	4.08	....

FORT MADISON.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
1	Beelman, G. H	Wagon	.....	43	11	4.40	3.00	3.72	....
2	Beelman, J. W	Wagon	......	50	13	5.20	3.30	4.14	....
3	Burton, James	Wagon	......	42	13	7.00	4.80	5.53	....
4	Conradt, George	Wagon	.....	41	11	7.60	3.20	4.45	....
5	Currier, T. G	Wagon No. 1.	......	358	3	5.80	3.80	4.53	....
6	Currier, T. G	Depot No. 2..	....	359	......	......	.....	......	....
7	Freishmier, B	Wagon	......	460	9	5.00	3.40	3.96	....
8	Freishmier, S	Wagon	......	280	10	4.60	3.30	3.90	....
9	Jansen, H	Wagon	......	540	10	4.80	3.60	3.94	...
10	Knapp & Benner	Wagon	......	38	12	5.20	3.60	4.20	....
11	Manshiem, J	Wagon	......	117	11	4.40	2.90	3.78	1
12	Manshiem, Mrs. B	Wagon	......	148	12	6.00	3.40	4.35	....
13	Shirk, Frank	Wagon	......	68	9	4.00	3.20	3.73	....
14	Smith, W. B	Wagon	......	146	10	5.30	3.80	4.60	....
15	Troji, Frank	Wagon	......	......	1	3.00	3.00	3.00	....
16	Wyman, H	Wagon	......	......	2	4.00	3.90	3.95	....
	Total	....	......	......	137	5.09	3.49	4.19	1

KEOKUK.

1	Driffield, H	Wagon	17	275	22	5.60	4.00	5.00	....
2	Emerson, M. E	Wagon	423	362	20	5.20	3.90	4.62	....
3	Ferris, R., Jr	Wagon	......	530	1	4.90	4.90	4.90	....
4	Hunt, R. A	Wagon	110	139	16	5.20	4.00	4.33	....
5	Keokuk Dairy Company	Wagon	252	333	15	5.00	3.50	4.10	....
6	Ketterson & Koss	Wagon	234	111	21	5.50	4.00	4.84	....
7	Knox, John	Wagon	221	202	19	5.20	3.50	4.40	....
8	Lang, Fred	Wagon	85	25	15	5.20	3.80	4.30	....
9	Nelson, O. G	Wagon	222	49	16	6.00	3.80	4.85	....
10	O'Brien, P	Wagon	......	471	1	5.00	5.00	5.00	....
11	Patterson, D	Wagon	......	495	15	5.50	3.80	4.86	....
12	Raber, C. N	Wagon	192	463	19	5.60	3.80	4.78	....
13	Rein, H	Wagon	487	311	14	4.80	3.70	4.07	....
14	Safford, C. C	Wagon	160	34	22	5.30	3.80	4.40	....
15	Sample, J. L	Wagon	196	230	18	5.40	3.50	4.10	....
16	Shappach, W. J	Wagon	86	402	16	6.00	3.40	4.82	....

KEOKUK—CONTINUED.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
17	Snyder, B	Wagon	404	......	......	......	.....	....	....
18	Ulrich, E. C	Wagon	......	296	3	5.10	5.00	5.05	....
19	Weyland, W. G	Wagon	......	......	2	5.20	5.00	5.10	....
20	Wright, C. A	Wagon	84	118	18	4.10	3.40	3.80	....
21	Yenawine, H. W	Wagon	159	112	16	5.10	4.00	4.58	. ..
	Total	....	......	......	289	5.25	3.99	4.40	....

MARSHALLTOWN.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
1	Bellus, S. E	Wagon	467	145	32	5.20	3.20	3.93	....
2	Cole, Alvin	Wagon	450	95	53	4.50	3.20	3 80	....
3	Griffiths, H	Wagon	.....	......	......	......	......	.....	....
4	Hazen, W	Wagon	496	210	39	5.00	3.10	3.87	....
5	McCord, D	Wagon No. 1.	464	355	35	4.20	3.30	3.70	...
6	McCord, D	Wagon No. 2.	.....	353	37	4.80	3.10	3.93	....
7	McCord, D	Depot	465	354	......	......	......	......	....
8	Melcher, F. W	Wagon	......	......	4	3.90	3.30	3 60	....
9	Plumb, J. M	Wagon	447	44	41	5.80	3.20	4.32	....
10	Roundy Bros	Wagon	466	211	50	6.00	3.40	4.00	....
11	Trieffry, G	Wagon	461	223	48	5.80	3.00	4.10	....
12	Varnum Bros	Wagon No. 1.	453	72	29	4.80	3.00	3.90	....
13	Varnum Bros	Wagon No. 2.	......	42	18	4.50	3.70	4.09	....
14	Wilson, W. R	Wagon	452	33	40	5.20	3.20	3.90	....
15	Winschell, E	Wagon	451	478	30	4.60	3 00	3.60	....
	Total	....	......	.....	456	4.94	3.21	3.95	....

MUSCATINE.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
1	Beegner, C	Wagon	318	283	26	4.20	3.00	3.50	....
2	Bierman, H. R	Wagon	30	73	28	5.40	3.40	4.18	....
3	Brande, J	Hand	......	......	3	5.00	3.60	4 30	....
4	Daukert, John	Wagon	56	114	28	4.60	3 40	4.10	....
5	Greenaway, Mrs. J	Depot	303	189	11	4.40	3.00	3.89	....
6	Harris Bros	Wagon	305	115	27	4.40	3.00	3.60	...
7	Jarvis & Son	Wagon	55	......	10	5.50	4.00	4 37	....
8	Jansen, H. E	Wagon	......	383	3	4.20	3.80	4.10	....
9	Lake, P. B	Wagon	8	96	27	5.40	3.20	4.20	....

MUSCATINE—CONTINUED.

Number.	NAME.	Manner of selling milk.	Permit number—1895.	Permit number—1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
10	Leferve, G. W.	Wagon	491	69	19	5.20	3.20	4.20	....
11	Luendecker, C	Wagon	290	220	28	5.00	3.40	4.10	....
12	Mittman Bros	Wagon	54	203	23	5.00	3.00	3.76	....
13	Ogilvie, W. J	Wagon	120	......	4	3.80	3.00	3.40	....
14	Scott, J. M.	Wagon	22	......	......	.....	......	......	....
15	Sidebottom, A. E.	Wagon	527	.....	5	4.40	3.40	3.92	....
16	Thomas, J. J.	Wagon	62	252	6	4.40	3.20	3.78	....
17	Trick, M.	Hand	......	......	8	5.80	3.60	4.70	....
18	Will, O. H	Wagon	9	289	20	5.00	3.00	3.94	....
19	Will Bros	Wagon	254	357	28	4.60	3.00	3.72	....
20	Wintermonte, B. D	Depot	255	140	8	5 00	3.00	4.30	....
21	Washburn, F	Wagon	......	453	3	3.80	3.20	3.60	....
	Total	....	......	......	315	4.75	3.27	3.98	....

OTTUMWA.

Number.	NAME.	Manner of selling milk.	Permit number—1895.	Permit number—1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
1	Bizer, J. F.	Wagon	171	......	......	......	......	......	....
2	Burns, E. F	Wagon	368	116	12	4.80	3.00	3.80	....
3	Chrisman, W. P	Wagon	......	322	11	6.00	3.00	4.24	....
4	Condiff, D. E.	Wagon	470	204	6	5.00	3.60	4.40	....
5	Daggert, E.	Wagon	179	335	12	6.30	3.20	4.70	....
6	French, Mrs. E. K.	Wagon	74	126	12	5.20	3 00	4.20	....
7	Fullmere, O. E	Wagon	36	205	12	4.70	3.00	3.84	....
8	Harsh, J.	Wagon	111	221	12	6.60	4.00	5.20	....
9	Huffman, H. & Bro.	Wagon	449	......	4	4.70	3.20	4.05	....
10	Hutson, T. L.	Wagon	168	341	12	5.20	3.10	4.32	....
11	Krueger, J. G.	Wagon	......	183	1	3.70	3.70	3.70	....
12	Micheal, B. F.	Wagon	264	187	14	6.60	3.40	4.51	....
13	Montague, H.	Wagon	183	253	12	5.80	3.40	4.78	....
14	Newman, G. W.	Wagon	71	255	12	5.20	3.10	4.10	....
15	Noble, T. H.	Wagon	496	298	10	5.60	3.00	4.50	....
16	Rush, D. J.	Wagon	330	......	1	4 80	4.80	4.80	....
17	Rupe, J. A.	Wagon	313	508	2	3.40	3.40	3.20	....
18	Simmons, N. C.	Wagon	272	380	12	5.00	3.00	4.82	....
19	Spankhower, I. L.	Wagon	45	274	12	7.00	3.20	4.74	....
20	Spear, W.	Wagon	......	490	5	4.10	3.10	3.52	....
	Total	....	......	......	174	5.24	3.81	4.26	....

SIOUX CITY.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
1	Akronson, A	Wagon	337	303	1	3.40	3.40	3.40	....
2	Baby Milk Dairy	Wagon	163	305	11	4.60	3.00	3.90	....
3	Bradstreet, C. O	Wagon	408	442	8	4.10	3.20	3.60	....
4	Bradstreet, A. J	Wagon No. 1.	343	93	7	3.90	3.20	3.64	....
5	Bradstreet, A. J	Wagon No. 2.	344	94	8	4.00	3.00	3.60	....
6	Bradstreet, T. E	Wagon	329	265	10	4.10	3.00	3.59	....
7	Clark, J. M	Wagon	345	......	5	4.00	3.60	3.76	....
8	Clark, H. D	Wagon	......	386	3	3.60	3.00	3.40	....
9	Fetterson, Andrew	Wagon	561	141	1	3.00	3 00	3.00	....
10	Francis, L	Wagon	339	......	4	3.80	3.80	3.80	....
11	Franklin, S. J	Wagon	544	413	5	4.00	3.00	3.44	....
12	Frisbie, W	Wagon	407	412	4	4.00	3.00	3.50	....
13	Hansen, Anna	Wagon	.....	527	1	3.60	3.60	3.60	....
14	Heath, D. B	Wagon	400	92	11	4.00	3.10	3.79	....
15	Herman, W. M	Wagon	382	299	12	4.00	3.00	3.51	....
16	Howell, E. P	Wagon	519	.....	4	3.80	3.20	3.50	....
17	Ingledue, J. S	Wagon	336	......	......	......	......	......	...
18	Jensen & Freese	Wagon No. 1.	347	476	16	4.00	3.40	3.76	....
19	Jensen & Freese	Wagon No. 2.	348	477	18	4.00	3.00	3.60	....
20	Johnson, C	Wagon	455	63	19	3.80	3.10	3.50	....
21	Johnson, A. R	Wagon	399	475	14	4.20	3.00	3.75	....
22	Johnson, J	Wagon	446	......	6	5.00	3.80	4.23	....
23	Kruman, L	Wagon	396	525	17	4.20	3 00	3.57	....
24	Lamb, W	Wagon	......	524	.....	......	......	......	....
25	Lynn Bros	Wagon	......	67	4	3.80	3.60	3.75	....
26	Lynn, Irwin	Wagon	463	......	2	4.00	3.20	3.60	....
27	Mahoney, W	Wagon	409	528	8	5.00	3.40	4.00	....
28	McNamara, R. E	Wagon	362	372	15	4.00	3.60	3.76	....
29	Miller, W. E	Wagon	442	......	4	4.00	3.00	3.65	....
30	Morgan, C. H	Depot	83	209	16	4.20	3.20	3.80	....
31	Moulin, W. H	Wagon	283	278	18	4,40	3.20	3.80	....
32	Newguard, A	Wagon	357	381	12	4.00	3.30	3.65	....
33	Oleson, F. & Son	Wagon	188	208	19	4.00	3.00	3.57	....
34	Oleson, Eric	Wagon	554	233	1	3.00	3.00	3.00	....
35	Perraso & Gambreno	Store	319	321	9	4.20	3.00	3.63	....
36	Pfold, L	Wagon	124	207	19	4.00	3.40	3.68	....

SIOUX CITY—CONTINUED.

Number.	NAME.	Manner of selling milk.	Permit number —1895.	Permit number —1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
37	Ray, W. D.	Wagon	443	498	8	4.20	3.00	3.55	....
38	Reise, C. B.	Wagon	457	142	7	3.80	3.20	3.64	....
39	Reynolds, C. C	Wagon	......	91	3	4.40	3.00	3.74	....
40	Robinson, C. M	Wagon	346	66	17	4.80	4.00	4.24	....
41	Rowe, N. J	Wagon	406	526	9	4.10	3.00	3.76	....
42	Schelker, W. O	Wagon	401	......	4	4.00	3.80	3.90	....
43	Sellan, J. J	Store	......	387	1	3.50	3.50	3.50	....
44	Severson, S. A	Wagon	232	270	8	4.60	3.10	3.42	....
45	Shepard, J. S	Wagon	257	320	17	4.00	3.00	3.43	....
46	Sherman, E. D	Depot	354	240	11	4.00	3.00	3.54	....
47	Smithers, T. H	Wagon	436	.....	6	5.00	3.40	4.23	....
48	Sorrenson, C	Wagon	260	384	16	4.20	3.00	3.73	....
49	Springer, C. P	Wagon	562	143	......	......	.....	......	....
50	Storrer, A. W	Wagon No. 1.	14	60	9	4.20	3.20	3.80	....
51	Storrer, A. W	Wagon No. 2.	15	61	8	4.20	3.40	3.75	....
52	Sutcliffe, Jas	Wagon	107	......	......	....	......	......	....
53	Talbot, T. R	Wagon	546	206	5	4.00	3.00	3.56	...
54	Treadwell, T. P	Wagon	82	360	9	4.40	3.00	3.58	...
55	Upton, J. L	Wagon	164	144	7	4.00	3.40	3.90	....
56	Vigars, John	Wagon	500	223	3	4.00	3.00	3.67	....
57	Washington, A. L	Wagon	326	231	12	4.40	3.00	3.71	....
58	Welin, C	Wagon	......	523	......	.....	......	.....	....
59	Wellman, G	Wagon	438	379	......	......	.....	.....	....
60	Wilcox, D. O	Wagon	361	65	20	4.80	3.00	3.67	....
61	Woodcock, A. C	Wagon No. 1.	5	29	13	5.00	3.40	3.96	....
62	Woodcock, A. C	Wagon No. 2.	6	......	8	4.20	3.60	3.90	....
63	Woodcock, A. C	Wagon No. 3.	7	......	3	4.00	3.80	3.93	....
	Total		......	......	506	4.10	3.41	3.88	....

In order to compare the number of tests, and the tests by months, during the past four years, the following table has been prepared. The end of each fiscal year designated, is October 31st:

BURLINGTON.

MONTHS.	1893.		1894.		1895.		1896.	
	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test
November	10	4.04	34	3.81	44	3.62	56	3.63
December	48	3.61	61	3.95	85	3.63	71	3.64
January	32	3.37	35	3.79	38	3 70	39	3.78
February	69	3.39	48	3.74	59	3.75	44	3.40
March	62	3.61	57	4.05	47	3 68	40	4.00
April	42	3.70	23	3.53	37	3.74	8	3.74
May	58	3 93	47	3.76	57	3.65	42	3.90
June	51	4.07	......	......	22	3.84	37	3.91
July	27	3.97	38	3.61	58	3.74	24	3.64
August	33	4.07	42	3.78	......	....	31	4 03
September	46	3.61	25	3.74	31	3.55	33	4.10
October	42	3.53	34	3.52	28	4.20	37	4.30
Total and average	527	3.78	444	3.75	456	3 75	462	3.84

CEDAR RAPIDS.

November	66	3.73	17	4.04	20	3.94	31	4.09
December	71	3.91	43	4.12	......	.....	12	4.00
January	18	3 94	14	3.94	39	3.77	......	.....
February	....	....	70	3.96	19	4.06	34	3.98
March	39	3.78	16	4.18	23	3.80	18	4.12
April	19	3.58	20	4.03	... ..	......	45	4 07
May	60	3.50	......	......	......	......	......	......
June	65	3.60	37	3.84	20	3.61	43	4.03
July	35	3.75	80	3.90	102	3.83	20	4.25
August	23	3.78	35	3 95	......	......	39	4.30
September	48	3.92	......	......	.....	.....	40	4 31
October	31	4.08	49	4.04	43	4.18	68	4.24
Total and average	480	3.78	381	4.00	266	3 88	350	4.16

CLINTON.

MONTHS.	1893.		1894.		1895.		1896.	
	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.
November	14	4.14	42	4.04	......	......	30	4.20
December	......	......	29	4.17	22	4.01	28	4.12
January	.....	.....	28	3.94	21	3.83	32	3.95
February	......	......	58	3.85	30	4.27	33	3.64
March	......	......	44	3.73	24	3.81	33	3.80
April	27	3.87	......	......	21	3.69	32	3.78
May	43	3.59	15	3.63	23	3.61	31	3.34
June	43	3.30	....	......	24	3.28	31	3.34
July	27	3.53	20	3.42	53	3.37	34	3.55
August	22	3.61	15	3.57	27	3.54	69	3.70
September	30	3.65	20	4.59	33	3.57	32	3.80
October	29	3.96	......	......	31	3.75	36	4.04
Total and average	235	3.71	271	3.88	309	3.71	421	3.77

COUNCIL BLUFFS.

November	14	3.52	38	3.82	15	3.69	39	3.92
December	22	3.54	40	3.99	46	3.61	34	3.90
January	40	3.44	38	3.87	30	3.54	35	3.83
February	43	3.44	12	3.72	32	3.52	55	3.60
March	58	3.40	53	3.68	64	3.53	72	3.67
April	75	3.52	14	3.67	67	3.50	81	3.84
May	49	3.49	14	3.35	61	3.53	57	3.80
June	50	3.39	.....	......	32	3.54	60	3.74
July	40	3.45	15	3.62	72	3.74	39	3.74
August	13	3.90	31	3.62	34	3.82	38	3.80
September	51	3.61	15	3.72	31	3.77	21	3.91
October	37	3.65	47	3.80	32	3.90	62	3.93
Total and average	492	3.53	320	3.62	506	3.64	593	3.83

DAVENPORT.

November	41	4.04	40	3.64	15	3.61	35	3.70
December	59	3.82	38	3.64	14	3.25	40	3.98
January	......	......	25	3.28	14	3.63	45	3.83
February	28	3.91	23	3.57	39	3.96	50	3.96

DAVENPORT—CONTINUED.

MONTHS.	1893.		1894.		1895.		1896.	
	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.
March	47	3.95	15	3.95	40	3.76	49	3.90
April	14	3.61	43	3.46	36	3.62	35	3.84
May	69	3.61	14	3.76	39	3.62	60	3.70
June	70	3.45	......	......	85	3.66	48	3.76
July	87	3.06	18	3.32	107	3.80	24	3.70
August	48	3.32	49	3.99	......	.....	36	3.54
September	49	3.61	43	3.97	31	3.76	70	3.72
October	39	3.87	30	3.65	24	3.73	73	3.71
Total and average	501	3.65	337	3.66	394	3.58	562	3.77

DES MOINES.

MONTHS.	1893.		1894.		1895.		1896.	
	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.
November	14	4.03	24	3.43	53	3.60	70	4.00
December	10	3.80	18	3.51	72	3.55	80	4.04
January	57	3.86	85	3.57	69	3.90	78	4.09
February	38	3.50	44	3.72	76	3.67	84	3.90
March	27	3.44	21	3.73	90	3.56	44	3.70
April	56	3.50	75	3.53	89	3.90	116	3.70
May	130	3.32	48	4.13	118	3.78	39	3.80
June	61	3.69	68	3.90	91	3.66	90	4.34
July	64	3.66	68	4.21	118	3.70	103	3.82
August	31	3.61	69	4.21	80	3.71	117	3 96
September	73	3.55	72	4.20	81	3.84	112	4.10
October	....	......	63	3.49	93	3.73	131	4.04
Total and average	545	3.27	655	3.81	1,029	3 70	1,064	3.96

DUBUQUE.

MONTHS.	1893.		1894.		1895.		1896.	
	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.
November	18	3.35	31	3.45	15	3.69	44	4.12
December	20	3.34	50	3.72	23	3.83	47	4.15
January	39	3.38	45	3.40	20	4.14	46	3.95
February	12	3.43	10	2.94	23	3 30	45	4.10
March	56	3.42	42	3.33	47	3.71	47	4.05
April	24	3.53	30	3.28	48	4.03	48	4.06
May	31	3.26	37	3.34	46	4 35	46	3 93
June	15	3.09	23	3.35	47	3.93	47	3 90
July	39	3.35	21	3.96	32	4.09	45	4.13

DUBUQUE—CONTINUED.

MONTHS.	1893.		1894.		1895.		1896.	
	Number tests made.	Average test.	Number tests made	Average test.	Number tests made.	Average test	Number tests made.	Average test.
August	41	3.50	19	3.73	36	3.96	46	4.29
September	56	3.55	22	3.71	48	3.94	47	4.03
October	74	3.57	27	3.87	24	3.95	31	4.07
Total and average	425	3.35	358	3.51	409	3.90	542	4.08

KEOKUK.

MONTHS.	1893.		1894.		1895.		1896.	
	Number tests made.	Average test.	Number tests made	Average test.	Number tests made.	Average test	Number tests made.	Average test.
November	14	4.14	20	4.31	12	4.32	30	4.42
December	......	......	32	[illegible]	33	4.57	11	4.32
January	......	......	21	4.60	87	4.85	16	4.00
February	....	......	33	4.19	24	53	28	4.61
March	.....	......	32	4.43	21	4.73	30	4.64
April	10	3.46	13	4.17	33	4.86	32	4.62
May	52	3.56	20	4.17	33	4.70	22	4.48
June	38	3.60	.....	.....	23	4.09	34	4.12
July	33	3.03	24	3.84	27	4.09	20	4.58
August	66	3.44	35	4.19	31	4.08	22	4.14
September	13	3.41	21	4.24	23	4.15	33	4.22
October	20	3.85	35	4.34	16	4.45	23	4.72
Total and average	246	3.56	287	4.32	316	4.41	289	4.40

MUSCATINE.

MONTHS.	1893.		1894.		1895.		1896.	
	Number tests made.	Average test.	Number tests made	Average test.	Number tests made.	Average test	Number tests made.	Average test.
November	9	4.42	23	3.73	24	3.92	14	3.10
December	......	......	28	3.81	35	4.04	46	3.99
January	......	......	44	3.72	12	4.02	45	3.97
February	16	3.49	49	3.65	37	4.06	11	3.27
March	......	......	67	3.79	51	3.90	32	3.86
April	15	3.76	18	3.79	26	3.52	23	3.97
May	......	.....	38	3.76	38	3.93	23	4.11
June	9	3.70	.....	......	35	3.74	....	.....
July	9	3.56	31	3.76	64	3.87	35	4.05
August	.....	.....	38	4.04	38	4.18	21	4.11
September	......	......	16	3.77	37	3.91	43	3.96
October	25	3.20	34	3.99	38	3.89	22	3.83
Total and average	83	3.69	386	3.80	435	3.91	315	3.98

OTTUMWA.

MONTHS.	1893.		1894.		1895.		1896.	
	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.
November	16	3.81	51	3.45	21	4.52	14	4.57
December	......	....	......	....	22	3.46	15	4.46
January	.....	......	28	3.34	11	3.96	11	4.34
February	......	.....	15	3.32	17	4.32	14	4.08
March	16	3.76	34	3.41	17	4.02	13	5.25
April	20	3.07	8	3.55	14	3.66	13	4.20
May	8	3.40	......	......	16	3.68	15	4.20
June	9	3.76	8	3.37	23	3.77	15	4.10
July	......	......	25	4.16	54	4.08	17	4.11
August	......	......	......	......	15	4.14	15	4.10
September	......	......	15	4.46	13	3.91	16	4.60
October	9	3.69	9	3.97	14	3.91	16	4.60
Total and average	78	3.87	193	3.67	237	3.95	174	4.26

SIOUX CITY.

MONTHS.	1893.		1894.		1895.		1896.	
November	37	3.97	38	3.52	27	3.81	51	3.61
December	28	3.59	23	3.67	28	3.70	53	3.80
January	37	3.65	34	3.54	27	3.76	45	3.92
February	23	3.93	25	3.61	35	3.73	44	3.90
March	37	3.75	33	3.77	40	3.64	41	4.19
April	28	3.72	24	3.62	41	3.44	39	3.70
May	39	3.57	39	3.67	43	3.63	40	3.80
June	25	3.83	24	3.53	38	3.65	40	3.76
July	22	3.64	29	3.69	111	3.86	39	3.64
August	12	3.88	29	3.76	43	3.76	35	3.60
September	25	3.53	29	3.73	39	3.50	31	3.58
October	15	3.49	28	3.88	20	3.61	49	3.49
Total and average	328	3.71	352	3.67	492	3.67	506	3.88

MARSHALLTOWN.

MONTH.	1896.	
	Number tests made.	Average test.
November	19	4.30
December	37	4.31
January	33	4.07
February	44	4.36
March	40	4.00
April	45	3.87
May	35	3.70
June	55	3.81
July	36	3.73
August	47	3 91
September	32	3.48
October	33	3.93
Total and average	456	3.95

FORT MADISON.

June	9	3.66
July	35	3.98
August	21	4.58
September	35	4.36
October	37	4.36
Total and average	137	4.15

For the whole report on the city milk test department we have gleaned the following results: For the city of Burlington 462 tests were made, with an average of 3.84. There were two tests below standard. For Cedar Rapids 350 tests were made, the average being 4.16. Clinton, 421 tests; average, 3.77. Council Bluffs, 593 tests; average, 3.88, with ten tests below standard. Davenport, 526 tests; average, 3.77. Des Moines, 1,064 tests; average, 3.96, with six tests below standard. Dubuque, 542 tests; average, 4.08. Keokuk, 289 tests; average, 4.40. Muscatine, 315 tests; average, 3.98. Ottumwa, 174 tests; average, 4.26. Sioux City, 506 tests; average, 3.88. Marshalltown, 456 tests; average, 3 95. Fort Madison, 137 tests; average 4.19, with two below standard. Total number of tests made, 5,871; average of all tests, 4.00; total number below standard, 20.

LIST OF IOWA CHEESE FACTORIES, NOVEMBER 1, 1896.

Arranged alphabetically according to counties and towns, near where factory is located, together with informatian pertaining to each.

Office record number.	LOCATED AT OR NEAR.	NAME OF CHEESE FACTORY.	Operated by an individual, co-operative or stock comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF CHEESE-MAKER.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Appanoose County.								
1	Iconium	Iconium	Stk Co	H. A. Thompson, Sec	Iconium	Moravia and [Tyrone.	N. Wycoff	Hd.	
2	Moravia	Star Cheese Co	Stk Co	Sam. Johnson, Sec.	Moravia	Moravia	Frank Selby	Hd.	
3	Moulton	Moulton	Ind	A. Dickson	Moulton	Moulton	Proprietor	Hd.	
4	Ray	Ray Cheese Co	Stk Co	R. F. Main, Sec	Ray	Main Station	H. G. Broshar	Hd.	
	Benton County.								
5	Newhall	Model	Ind	G. M. Olmsted	Cedar Rapids. [Linn Co.	Newhall	J. H. Huyck	Hd.	
6	Rogerville	Excelsior	Ind	R. E. Fairbanks.	Rogerville	Garrison	Proprietor	Hd	884
	Black Hawk County								
7	*Waterloo	Waterloo—North Star	Ind	The Fowler Co	Waterloo	Waterloo	Charles Wood	Test.	
8	*Waterloo	Waterloo	Ind	The Fowler Co	Waterloo	Waterloo	F. E Wightman	Test.	
	Bremer County.								
9	*Janesville	Janesville	Ind	The Fowler Co	Waterloo, Bl'ck [Hawk Co.	Janesville	A. M. Royer	Test.	
	Calhoun County.								
10	*Rockwell City	Rockwell City B. & C. Factory	Stk Co	T. C. Gregg, Sec	Rockwell City.	Rockwell City.	T. E. Garity	Test.	
	Cedar County								
11	West Branch	West Branch—"Quaker"	Ind	I. H. Shaver Ch. Co.	Cedar Rapids, [Linn Co.	West Branch	D. Van Patten	Test.	
	Cerro Gordo County.								
12	Sheffield	Sandridge	Stk Co	D. O'Donnell, Sec.	Rockwell	Rockwell	Charles Gerber.	Test.	
13	Burchinal	Burchinal	Ind	Coates & Hoffman	Burchinal	Burchinal	Lewis Hoffman.	Hd.	

	Clarke County								
14	Weldon, Decatur Co.	Weldon Cheese Factory	Ind	Tallman & Parr	Weldon	Weldon	L. M. Parr	Test	677
15	Woodburn	Farmers' B. & C. Ass'n	Stk Co	H. P. Halling, Sec	Woodburn	Woodburn	H. W Hasslinger	Test	716
	Crawford County.								
16	Buck Grove	Thew's Cheese Factory	Ind	S. M. Thew	Buck Grove	Buck Grove	Proprietor	Hd.	
	Dallas County								
17	Woodward	Woodward Creamery	Ind	H. P. Colenky, Mgr.	Woodward	Woodward	Fred Colenky	Test	204
	Davis County.								
18	Drakeville	Drakeville Dairy Association	Stk Co	A Fontz, Sec	Drakeville	Drakeville.			
	Dickinson County.								
19	Spirit Lake	Spirit Lake B. & C. Factory	Ind	Painter & Painter	Spirit Lake	Spirit Lake	C. A. Painter	Test.	
	Floyd County.								
20	Charles City	Elm Spring Cheese Factory	Ind	H. D. White & Co	Charles City	Charles City	H. D. White	Hd.	
	Franklin County.								
21	Dows	Dows Factory	Ind	A. A. Bangs	Dows	Dows	Josie Bangs	Hd.	
	Greene County.								
22	Grand Junct'n	Grand Junction	Ind	J. C. Harker	Grand Junct'n	Grand Junct'n		Test.	
	Gurhrie County.								
23	Jamaica	Jamaica Cheese Factory	Ind	A. H. Chadsey	Jamaica	Jamaica	Proprietor	Hd.	
	Grundy County.								
24	*Reinbeck	The Fowler Co	Ind	The Fowler Co	Water co, Bl'ck Hawk Co.	Reinbeck	G A. Peace.		
	Hardin County.								
25	Hubbard	Cottage Factory	Ind	S. C. Christopher	Cottage.	Hubbard	W. Plumisight	Hd	264
26	Iowa Falls	Ellis Cheese Manufacturing Co.	Stk Co	W. I. Clark, Mgr	Iowa Falls	Iowa Falls	W. I. Clark	Hd.	
	Henry County								
27	Mt. Pleasant	Pleasant Valley	Ind	Neol Campbell	Mt. Pleasant	Mt. Pleasant	Proprietor	Hd.	
	Howard County.								
28	Cresco	Cresco Cheese Co	Ind	Kellow & House	Cresco	Cresco	J. J. House	Hd.	
	Humboldt County.								
29	L verne	D. Martyn's	Ind	D. Martyn	Luverne	Luverne		Hd.	
30	Renwick	Elmer Factory	Ind	Conrad Elmer	Renwick	Renwick	Fred Fahrney	Hd.	

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*Manufacture both butter and cheese.

LIST OF IOWA CHEESE FACTORIES—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CHEESE FACTORY.	Operated by an individual, co-operative or stock comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF CHEESE-MAKER.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Howard County.								
31	Renwick........	Fred Klasse Factory.............	Ind...	Fred Klasse.........	Renwick.......	Renwick........	John Roteberer	Hd.	
32	Renwick.......	Pioneer Factory..................	Ind...	Nic. Gerber	Luverne, Kossuth Co.	Renwick........	Proprietor......	Hd.	
33	Renwick.......	Speich Factory	Ind...	Fred Speich..........	Renwick......	Renwick........	B. Hoesley......	Hd.	
	Ida County.								
34	Arthur.........	Arthur Factory..................	Ind...	M. J. Blaser.........	Arthur.........	Arthur.........	Proprietor......	Hd.	
	Iowa County.								
35	Ladora.........	Ladora Factory..................	Ind...	D. D. Case...........	Ladora.........	Ladora.........	Proprietor.	Hd.	
	Johnson County.								
36	Frank Pierce..	Frank Pierce B. & C. Co..........	Ind...	Henry C. Karsteadt.	Frank Pierce..	Kalona.........	Proprietor......	Hd.	
37	Iowa City......	Sharon Cheese Factory..........	Co-op	F. M. Weeber, Sec...	Iowa City......	Iowa City.... .	J. Gunyo........	Hd.	
38	Morse.........	Shamrock Cheese Factory........	Ind...	I. H. Shaver Ch. Co.	Cedar Rapids, Linn Co	Morse.........	F. S. Snyder.....	Hd....	200
	Jones County.								
39	Onslow.........	Mineral Valley Cheese Factory..	Ind...	John Fagan..........	Onslow	Onslow.........	H. E. Willard...	Hd....	378
40	Onslow	Onslow Cheese Factory..........	Ind...	S. L. Gilbert.........	Onslow	Onslow.........	Floyd Johnson..	Test..	48
	Keokuk County.								
41	Talleyrand ...	Talleyrand.......................	Stk Co	L. M. Tucker, Sec....	Talleyrand....	Keota..........	C. Tucker...	Hd....	66
42	Webster........	Webster Cheese Factory.........	Ind...	M. M. Wheeler, Sec..	Webster........	Webster........	H. C. Wheeler...	Hd.	
	Lee County.								
43	Ft. Madison ...	Denmark Factory................	Ind...	T. G. Currie.........	Ft. Madison ...	Ft. Madison ...	AlbertC.Linds'y	Hd.	
44	*West Point ...	West Point Cheese Factory	Ind...	Pogge & Stolze......	West Point....	West Point	Henry Pogge....	Hd.	

	Linn County.								
45	Marion.........	Gray Factory......................	Ind...	Edward C. Clark....	Cedar Rapids..	Cedar Rapids..	W. R. Carol	Hd.	
46	Springville	Springville Factory.........	Ind...	Edward C. Clark....	Cedar Rapids..	Cedar Rapids.	F. H. Huyck....	Hd....	128
	Marshall County.								
47	*Liscomb.	Liscomb Butter and Cheese Co...	Co-op.	C. E. Bierstorm......	Liscomb........	Liscomb........	C. E. Bierstorm.	Test.	
	Montgomery County.								
48	Red Oak	Lincoln..........................	Ind...	E. T. Evans..........	Red Oak	Red Oak	Proprietor.	Hd.	
	Monroe County.								
49	Albia..........	Bluff Creek Factory..............	Co-op.	John Forster, Sec....	Albia..........	Albia..........	George Murfise .	Hd.	
50	Albia..........	Bone Factory......................	Ind...	S. G. Bone...........	Albia..........	Albia..........	Proprietor.	Hd....	734
51	Albia..........	Diamond Cheese Co..............	Stk Co	Leroy Miller, Mgr...	Albia..........	Albia	....	Hd.	
52	Albia	Enix & Smith	Ind...	Enix & Smith	Albia..........	Albia..........	Proprietors	Hd.	
53	Albia..........	Gholsen Cheese Factory..........	Ind...	Dan Gholsen	Selection.......	Albia..........	May Gholsen....	Hd.	
54	Albia..........	Hinton Factory..................	Ind...	Samuel Hinton......	Albia..........	Albia..........	Proprietor.......	Hd.	
55	Albia.....	Hollingshead	Ind...	J. Hollingshead.....	Albia..........	Albia..........	Proprietor.......	Hd.	
56	Albia.....	Griffin Cheese Factory.	Ind...	H. Griffin	Albia..........	Albia..........	....	Hd.	
57	Albia..........	Pharis Cheese Factory...........	Ind...	M. A. Pharis.........	Albia..........	Albia..........	Henry Pharis...	Hd.	
58	Hilton....	Hilton Factory.......	Ind...	Rowles Bros.........	Albia..........	Albia..........	Harlan Rowles..	Hd.	
59	Selection.......	Selection	Ind...	Rowles Bros.........	Albia..........	Albia..........	....	Hd.	
60	Tyrone.........	Mt. Caramel......................	Ind...	F. W. Crouch	Tyrone.........	Tyrone.........	R. E. Stoops.....	Hd.	
	Page County.								
61	Northboro.....	Northboro Cheese Factory........	Ind...	W. H. Hatfield.......	Northboro......	Northboro......	Proprietor.......	Hd.	
	Poweshiek County.								
62	Grinnell........	Neely's..........................	Ind...	J. E. Neely & Son....	Grinnell........	Grinnell	W. J. Neely	Test..	21
	Ringgold County.								
63	Mt. Ayr........	Liberty Cheese Co................	Co-op.	J. E. Main, Sec	Mt. Ayr.. ..	Mt. Ayr........	L. O. Main.......	Hd.	
	Sac County.								
64	Odebolt........	Wheeler Factory	Ind...	H. O. Wheeler........	Odebolt	Odebolt.........	Philip W. Farr.		
65	*Sac City.......	Blue Grass Butter and Ch. Fact'y	Ind...	I. Hillman...........	Sac City........	Sac City........	Fred Hillman...	Test..	769

LIST OF IOWA CHEESE FACTORIES—CONTINUED.

Office record number.	LOCATED AT OR NEAR	NAME OF CHEESE FACTORY.	Operated by an individual, co-operative or stock comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF CHEESE-MAKER.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Story County.								
66	*Ames	Iowa Agri. College Creamery		State of Iowa	Ames	Ames	G. L. McKay	Test	304
	Taylor County								
67	Guss	Maple Grove	Ind	I. Schoonover	Guss	Guss	Proprietor.	Hd.	
68	Sharpsburg	Eastlack	Ind	F. M. Eastlack	Sharpsburg	Conway	Proprietor	Hd.	
	Washington County.								
69	Dublin	Dublin Cheese Factory	Co-op.	C. E. Lemley, Sec.	Dublin	West Chester	M. L. Doaner	Hd.	
	Wayne County.								
70	Clio	Clio Co-operative	Stk Co	D. M. Brunner	Clio	Clio	R. E. Spencer	Test.	
71	Corydon	Corydon Cheese Factory	Ind	Cross & White	Corydon	Corydon	Clark White	Hd.	81
72	Lineville	Lineville Cheese Factory	Ind	Mathew De Haan	Lineville	Lineville	Proprietor	Hd.	
	Winnebago County.								
73	Forest City	Holland Factory	Stk Co	S. O. Holland, Sec.	Forest City	Forest City	Fred Schuler	Hd.	

TABLE No. XVIII.

CHEESE FACTORY LIST BY COUNTIES.

Showing total number of cheese factories, how, and number of months operated, during year ending May 1, 1896. Also number persons employed, number of patrons, and number of cows, together with average for each county.

COUNTY.	TOTAL NUMBER OF CHEESE FACTORIES, SHOWING NUMBER INDIVIDUAL, CO-OPERATIVE, AND STOCK COMPANIES.					TOTAL NUMBER RECEIVING MILK BY THE TEST OR HUNDRED.			NUMBER OPERATED ENTIRE YEAR; NUMBER LESS THAN A YEAR; AVERAGE NUMBER OF MONTHS.					TOTAL NUMBER PERSONS EMPLOYED IN FACTORIES.					NUMBER OF PATRONS FURNISHING MILK.		NUMBER OF COWS PRODUCING MILK DELIVERED TO FACTORIES, WITH AVERAGE NUMBER OF COWS FOR EACH FACTORY.			NUMBER OF FACTORIES BUILT AND REMODELED IN 1896.		
	Total number.	Number factories reported.	Individual.	Co-operative.	Stock company.	Number factories reported.	By test.	By the hundred pounds.	Number factories reported.	Twelve months	Six months or more.	Less than six.	Average No. of months	Number factories reported.	Cheese-makers.	Assistants.	Collecting milk.	Total number employed.	Number factories reported.	Number patrons.	Number factories reported.	Number of cows.	Average number of cows per factory.	Number factories.	Number remodeled.	Total built and remodeled.
The state	71	59	46	4	9	55	15	40	60	26	28	6	9.4	62	63	29	91	182	58	1,540	53	16,150	305	3	..	3
Appanoose	4	4	2	....	2	4	..	4	4	....	4	...	8.5	4	4	1		5	4	117	4	1,166	892	..	...	....
Benton	2	2	2	....	...	2	....	2	2	2	....	....	12.0	2	2	2	8	7	2	100	2	1,220	610	....	...	....
Black Hawk	2	2	2	....	....	2	2	....	2	2	....	....	12.0	2	2	2	...	4	2	66	2	864	432	....	....	....
Bremer	1	1	1	....		1	1	....	1	1	....	....	12 0	1	1	2	....	3	1	108	1	1,080	1,080	...	....	....
Calhoun	1	....	....	....	..	....	....	...	....	....	....	....	.....	....	....	....	...	....	....	......	....	....	....	....	...	....
Cedar	1	1	1	....	...	1	1	....	1	1	....	....	12.0	1	1	1	6	8	1	128	1	896	896	....	....	....
Cerro Gordo	1	1	1	...	....	1	....	1	1	....	1	...	6.0	1	1	....		1	....	......	....	....	....	....	....	....
Clarke	2	2	1	....	1	2	1	1	2	1	1	....	11.0	2	2	2	10	14	1	90	1	450	450	....	1	1
Crawford	1	1	1	..	....	1	1	...	1	....	1	....	8.0	1	1	....	....	1	1	6	1	84	84	....	...	....
Dallas	1	....	....	....	....	....	....	....	....	....	....	....	......	....	...	..	...	....	....	......	....	....	....	....	....	....
Dickinson	1	1	1	....	....	1	1	....	1	....	....	1	5 0	1	1	1	5	7	1	35	1	525	525	....	....	....
Floyd	1	1	1	....	....	1		1	1	1	.	....	12.0	1	1	2	....	3	1	60	1	400	400	....	...	...
Franklin	1	1	1	....	....	1	....	1	1	....	1	....	8.0	1	1	...	....	1	1	1	1	25	25	....	....	....
Greene	1	....	....	....	....	....	....	....		....	....	....		....	....	..	..	....	....	......	....	....	....	....	....	....
Grundy	1	1	1	....	....	1	1	....	1	1	..	....	12.0	1	1	1	...	2	1	26	1	208	208	...	....	. .
Guthrie	1	1	1	....	....	1	....	1	1	....	1	....	9.0	1	1	....	....	1	1	50	1	400	400	....	....	....
Hardin	2	2	1	....	1	2	....	2	2	....	2	....	6.5	2	2	2	....	4	2	32	2	1,480	740	...	...	....
Henry	1	1	1	....	...	1	1	....	1	1	....	....	12 0	1	1	1	4	6	1	1	1	27	27	....	....	....
Howard	1	1	1	....	....	1	....	1	1	...	1	....	6.0	1	1	....	3	4	1	35	1	850	850	..	....	....

TABLE No. XVIII—CONTINUED.

Humboldt	5	5	4	1	....	5	....	5	5	3	1	1	9 6	4	4	1	4	9	4	24	4	446	112	....	....	....
Ida	1	1	1	....	...	1	. ..	1	1	1	....	....	12.0	1	1	....	....	1	1	19	1	114	114	....	....	....
Iowa	1	1	1	...	....	1	....	1	1	....	....	1	5.0	1	1	....	....	1	1	15	1	210	210	....	....	....
Johnson	3	2	1	1	...	2	....	2	1	...	1	....	7.0	2	2	1	3	6	2	22	2	230	115	....	....	....
Jones	2	2	2	....	....	2	1	1	2	2	....	....	12.0	2	2	....	....	2	2	37	2	519	259	....	....	....
Keokuk	2	1	....	....	1	1	....	1	1	....	1	....	9.0	1	1	....	...	1	1	60	1	480	480	..	...	....
Lee	2	2	2	....	....	2	1	1	2	1	1	.	10.0	2	2	....	6	8	1	11	1	110	110	...	....	....
Linn	2	2	2	...	...	2	....	2	2	2	....	....	12.0	2	2	....	14	16	...	....	....	....	....	....	....	....
Marshall	1	1	....	....	1	1	1	....	1	1	....	....	12.0	1	1	1	...	2	....	....	...	....	....	....	...	....
Montgomery	1	1	1	....	...	...	....	....	1	...	1	....	8.0	1	1	....	....	1	1	12	1	120	120	...	....	....
Monroe	12	8	7	1	...	6	....	6	10	2	5	3	7 2	12	12	1	....	18	9	123	9	1,094	121	2	....	2
Poweshiek	1	1	1	....	...	1	1	...	1	1	....	....	12 0	1	1	1	....	2	1	27	1	324	324	....	....	....
Ringgold	1	1	....	1	....	1	....	1	1	....	1	....	7.0	1	1	....	...	1	1	21	1	168	168	....	....	....
Sac	3	2	2	...	....	1	1	...	2	2	....	....	12.0	2	2	1	....	3	2	31	2	600	800	....	....	...
Story	1	....	...	....	....	...	....	...	....	....	....	....	......	....	...	....	....	....	....	......	...	....	....	....	....	....
Taylor	2	1	1	....	....	1	...	1	1	1	....	....	12.0	1	1	1	6	8	1	50	1	400	400	1	....	....
Washington	1	1	...	...	1	1	...	1	1	....	1	....	8.0	1	1	....		1	1	82	1	256	256	...	....	....
Wayne	3	3	2	....	1	3	1	2	3	....	3	....	8.6	3	3	4	27	34	3	200	3	1,750	583	...	....	....
Winnebago	1	1	...	....	1	1	....	1	1	....	1	....	6 0	1	1	1	. ..	2	1	11	1	154	154	....	....	....
Total	71	59	46	4	9	55	15	40	60	26	28	6	9.4	62	62	29	91	183	53	1,540	53	16,150	305	8	1	8

TABLE No. XIX.

Cheese factory list by counties, showing value of plants, pounds of milk received, pounds and kinds of cheese manufactured, value and disposition of same, for the year ending May 1, 1896.

COUNTIES.	TOTAL VALUE OF MILK RECEIVED FROM MAY 1, 1895, TO MAY 1, 1896.			TOTAL POUNDS OF MILK RECEIVED FROM MAY 1, 1895, TO MAY 1, 1896.			POUNDS OF CHEDDAR AND YOUNG AMERICA CHEESE, POUNDS OF SWISS CHEESE, POUNDS OF LIMBURGER CHEESE, POUNDS OF ALL OTHER GRADES NOT NAMED, AND TOTAL POUNDS OF ALL CHEESE MANUFACTURED FROM MAY 1, 1895, TO MAY 1, 1896.						TOTAL VALUE OF CHEESE MANUFACTURED.		POUNDS OF CHEESE SOLD OR CONSUMED IN IOWA, AND POUNDS SHIPPED OUTSIDE THE STATE.		
	Number cheese factories	Number reported	Value.	Number receiving milk.	Number reported.	Total pounds milk received.	Number reported	Total pounds cheddar and Young America.	Total pounds Swiss.	Total pounds limburger.	Total pounds of all other grades not specified.	Total pounds of all cheese manufactured	Number reported.	Value.	Number reported.	Pounds sold in Iowa.	Pounds shipped outside state.
The state	71	58	$98,050	71	56	30,797,697	55	1,231,655	116,745	90,000	1,739,786	3,187,186	55	$272,842.28	55	2,696,039	491,147
Appanoose	4	4	2,100	4	4	2,246,608	4	64,814	....	..... .	172,350	237,164	4	18,600 00	4	180,744	56,420
Benton	2	2	6,000	2	2	2,660 825	2	85,106	. . ..	....	165,989	251,495	2	20,104.31	2	209,997	41,498

Black Hawk	3	3	7,500	3	3	1,582,000	3	158,200	....	....	....	158,200	3	11,865 00	3	150,290	7,910
Clarke	3	3	2,500	3	3	1,216,000	3	...	....	....	121,560	121,560	3	9,300 00	3	121,560	....
Hardin	3	3	3,000	3	3	1,050,000	3	221,300	....	....	....	221,300	3	18,529 00	3	221,300	....
Humboldt	5	4	3,200	5	4	1,999,958	4	27,500	116,745	45,000	31,750	220,995	4	16,670 00	4	44,166	176,829
Johnson	3	3	7,000	3	3	856,928	3	....	....	....	79,547	79,547	2	6,645 09	3	69,547	10,000
Jones	3	3	8,400	2	2	1,237,098	2	....	....	.....	185,816	185,816	3	10,940.00	2	185,816	....
Keokuk	3	1	3,500	3	2	798,567	3	30,000	....	....	50,000	80,000	3	6,082 35	3	80,000	....
Lee	2	2	4,000	2	3	444,048	3	18,000	....	....	30,000	43,000	3	13,436.56	3	43,000	....
Linn	3	3	6,500	3	....	....	....	....	....	....	....	....	....	....	....	....	....
Monroe	12	10	6,100	12	10	2,481,295	10	55,590	....	....	188,688	239,278	10	18,982 74	10	229,740	9,538
Sac	2	2	4,000	3	1	180,000	1	18,000	....	....	....	18,000	1	1,800 00	1	18,000	....
Wayne	3	3	4,150	3	3	1,441,248	3	50,000	....	....	92,940	142,940	3	14,760.06	3	70,804	72,136
Bremer	*26	18	35,100	26	17	12,624,138	17	507,745	....	54,000	676,646	1,238,391	17	104,627.17	17	1,121,575	116,816
Calhoun																	
Cedar																	
Cerro Gordo																	
Crawford																	
Dallas																	
Davis																	
Dickinson																	
Floyd																	
Franklin																	
Greene																	
Grundy																	
Guthrie																	
Henry																	
Howard																	
Ida																	
Iowa																	
Marshall																	
Montgomery																	
Page																	
Poweshiek																	
Ringgold																	
Story																	
Taylor																	
Washington																	
Winnebago																	
Total	71	58	$98,050	71	55	30,797,697	55	1,231,655	116,745	99,000	1,739,786	3,187,186	55	$272,342.28	55	2,696,039	491,147

* The information from counties having but one factory reported is shown collectively in the brace.

FINANCIAL STATEMENT.

FROM NOVEMBER 1, 1895, TO NOVEMBER 1, 1896.

Funds available November 1, 1895		$ 2,992 39
Amount appropriated by the Twenty-sixth General Assembly		11,000 00
Commissioner's salary account	$ 1,500.00	
Commissioner's contingent expense account	367.98	
Clerk's salary account	900.00	
Stationery and printing	171 39	
Office supplies	13.25	
Envelopes and postage	270.35	
Laboratory supplies	111.67	
Telegraph and telephone	12 22	
Express and freight account	27.99	
Special analyses and examination	132.10	
Milk agents' fees	1,446.00	
Milk agents' special work	76.85	
Extra office help	60.12	
Legal counsel and transcript	15.50	
Balance unexpended November 1, 1896	8,886.97	
Total	$ 13,992.39	$ 13,992.39

RECAPITULATION.

Total funds available		$ 13,992.39
Total expenditures from November 1, 1895, to November 1, 1896	$ 5,105.42	
Balance appropriations unexpended November 1, 1896	8,886.97	
Total	$ 13,992 39	$ 13,992.39
Collected for 566 permits issued to city milk dealers for year ending July 4, 1896	$ 566.00	
Remitted to state treasurer for 551 permits		$ 566 00
Total	$ 566 00	$ 566 00

IOWA STATE DAIRY LAWS.

MILK LAW.

CHAPTER 50, LAWS TWENTY-FOURTH GENERAL ASSEMBLY.

AN ACT to repeal section 4012 of the code of 1873 and provide a substitute therefor, and to enlarge the duties and powers of the state dairy commissioner, and to provide an appropriation therefor.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. IMPURE MILK—PENALTY FOR VIOLATION.—That section 4042 of the code of 1873 is hereby repealed and the following is enacted in lieu thereof: If any person or corporation shall sell or exchange, or expose for sale or exchange, deliver or bring to another for domestic use, or to be converted into any product of human food whatsoever, any unclean, impure, unhealthy, adulterated, unwholesome, or skimmed milk, or milk from which has been held back what is commonly known as strippings, or milk taken from an animal having disease, sickness, ulcers, abscesses or running sore, or was taken from an animal fifteen days before or less than five days after parturition, shall upon conviction thereof be fined not less than twenty-five dollars ($25) nor more than one hundred dollars ($100), and be liable in double the amount of damages to the person or persons upon whom such fraud shall be committed. *Provided*, that the provisions of this act shall not apply to skimmed milk when sold as such.

SEC. 2. SKIMMED MILK DEFINED.—For the purposes of this act milk which is proved by any reliable method of test or analysis, to contain less than three pounds of butter fat to the one hundred pounds of milk, shall be regarded as skimmed or partially skimmed milk.

SEC. 3. ENFORCEMENT.—It is hereby made the duty of the dairy commissioner to enforce the provisions of the foregoing sections.

SEC. 4. MILK AGENTS' COMPENSATION.—The state dairy commissioner is hereby authorized to appoint agents in every city having over ten thousand inhabitants, in the state of Iowa, who are to collect the samples of milk as sold in such cities, and it shall be their duty to forward such samples to the office of the commissioner in Des Moines in such manner as he shall direct. The compensation of such agents at any one time shall not be more than three dollars ($3) for collecting and delivering the same to the express companies.

SEC 5. NUMBER OF COLLECTIONS.—The number of times samples are collected in each city of more than ten thousand inhabitants shall not exceed an average of thirty times during any one year.

SEC. 6. CLERKS' HIRE INCREASED.—The state dairy commissioner, if it shall be found necessary, may increase the clerk hire of his office twenty-five dollars ($25) per month.

SEC. 7. MILK DEALERS' PERMIT—PENALTY FOR VIOLATION.—Every milk dealer who runs a milk wagon, milk depot, or sells milk from a store, in the cities that have over ten thousand inhabitants, in the state of Iowa, shall obtain a permit from the state dairy commissioner's office, for which he shall pay the sum of one dollar ($1) annually. The commissioner shall keep a book in which shall be registered the name, location and number of each dealer in milk, and a record of each analysis. Whoever violates the provisions of this section, upon conviction thereof, shall be fined not less than ten dollars ($10) nor more than twenty-five dollars ($25).

SEC. 8. POWER TO TAKE AND INSPECT.—The dairy commissioner or his agents shall have power and authority to open any can or vessel containing milk which is offered for sale, and may inspect the contents thereof and may take therefrom samples of milk for analysis.

SEC. 9. APPROPRIATION —That there is hereby appropriated out of any money in the state treasury, not otherwise appropriated, the sum of twenty-five hundred dollars, or so much as may be necessary for the purpose of carrying out the provisions of this act.

Approved April 8, 1892.

CHAPTER 46, LAWS TWENTY-FIFTH GENERAL ASSEMBLY.

A LAW prohibiting the manufacture, sale and use of any imitation butter and cheese, and regulating the manufacture, sale and use of substitutes for butter and cheese not having a yellow color.

AN ACT to repeal sections 1, 2, 3, 4, 5, 8, 10 and 15 of chapter 52 of the acts of the Twenty-first General Assembly, and to repeal section 6 of chapter 52 of the acts of the Twenty-first General Assembly as amended by senate file No. 51 of the Twenty-fifth General Assembly, and approved February 12, 1894, and to enact substitutes therefor; to prohibit the manufacture, sale, keeping for sale and fraudulent use of substances designed as imitation butter and cheese, and to regulate the manufacture, sale and keeping for sale of any substance designed to be used as a substitute for butter and cheese.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. LAWS REPEALED.—That sections 1, 2, 3, 4, 5, 8, 10 and 15 of chapter 52 of the acts of the Twenty-first General Assembly, and section 6 of chapter 52 of the acts of the Twenty-first General Assembly as amended by senate file No. 51 of the Twenty-fifth General Assembly, and approved February 12, 1894, are hereby repealed and the following enacted in lieu thereof.

SEC. 2. DEFINING IMITATION BUTTER AND CHEESE —That for the purpose of this act every article, substitute or compound, other than that produced from pure milk or cream from the same, made in the semblance of butter and designed to be used as a substitute for butter made from pure milk or cream from the same, is hereby declared to be imitation butter; and that for the purpose of this act every article, substance or compound other than that produced from pure milk or cream from the same, made in the semblance of cheese and designated to be used as a substitute for cheese made from pure milk or cream from the same, is hereby declared to be imitation cheese; *provided*, that the use of salt, rennet and harmless coloring matter for coloring the product of pure milk or cream shall not be construed to render such product an imitation.

SEC. 3. PROHIBITING THE COLORING YELLOW OF SUBSTITUTES FOR BUTTER OR CHEESE.—No person shall coat, powder or color with annatto or any coloring matter whatever, any substance designed as a substitute for butter or cheese, whereby such substitute or product so colored or compounded shall be made to resemble butter or cheese, the product of the dairy.

No person shall combine any animal fat or vegetable oil or other substance with butter or cheese, or combine therewith or with animal fat or vegetable oil or combination of the two or with either one or with any substance or substances whatever, any annatto or compound of the same, or any other substance or substances, for the purpose or with the effect of imparting thereto a yellow color or any shade of yellow, so that such substitute shall resemble yellow or any shade of genuine yellow butter or cheese, nor introduce any such coloring matter or such substance or substances into any of the articles of which the same is composed. *Provided*, nothing in this act shall be construed to prohibit the use of salt, rennet and harmless coloring matter for coloring the products of pure milk or cream from the same.

No person shall by himself, his agent or employes, produce or manufacture any substance in imitation or semblance of natural butter or cheese, nor sell, nor keep for sale, nor offer for sale, any imitation butter or cheese made or manufactured, compounded or produced in violation of this section, whether such imitation butter or cheese shall be made or produced in this state or elsewhere.

This section shall not be construed to prohibit the manufacture and sale, under the regulations hereinafter provided of substances designed to be used as a substitute for butter or cheese and not manufactured or colored as herein prohibited.

SEC. 4. LAWFUL SUBSTITUTES—HOW MARKED.—Every person who lawfully manufactures any substance designed to be used as a substitute for butter or cheese shall mark by branding, stamping or stencilling upon the top and side of each tub, firkin, box, or other package in which such article shall be kept and in which it shall be removed from the place where it is produced, in a clean and durable manner in the English language, the words, "substitute for butter" or "substitute for cheese," as the case may be, in printed letters, in plain Roman type, each of which shall not be less than one inch in length by one-half inch in width.

SEC. 5. SHIPPING.—No person, by himself or another, shall ship, consign or forward by any common carrier, whether public or private, any substance designed to be used as a substitute for butter or cheese, and no carrier shall knowingly receive the same for the purpose of forwarding or transporting unless it shall be manufactured and marked as provided in the preceding sections of this act, and unless it be consigned by the carrier and receipted for by its true name; *provided*, that this act shall not apply to any goods in transit between foreign states across the state of Iowa.

SEC 6. HAVING IN POSSESSION.—No person shall have in his possession or under his control, any substance designed to be used as a substitute for butter and cheese unless the tub, firkin, box, or other package containing the same be clearly and durably marked as provided by section 4 of this act; *provided*, that this section shall not be deemed to apply to persons who have the same in their possession for the actual consumption of themselves or family.

Every person having in possession or control of any substance designed to be used an a substitute for butter or cheese which is not marked as required by the provisions of this act, shall be presumed to have known during the time of such possession or control the true character and name, as fixed by this act, of such product.

SEC. 7. SELLING.—No person by himself, or another, shall sell, or offer for sale, any substance designed to be used for a substitute for butter or cheese under the name of, or under the pretense that the same is butter or cheese; and no person, by himself or another, shall sell any substance designed to be used as a substitute for butter or cheese, unless he shall inform the purchaser distinctly at the time of the sale that the same is a substitute for butter or cheese, as the case may be, and shall deliver to the purchaser at the time of the sale a statement clearly printed in the English language, which shall refer to the article sold, and which shall contain in prominent and plain Roman type a statement that the substanee so sold is a substitute for butter or cheese, as the case may be, and such statement shall also give the name and place of business of the maker.

SEC. 8. HOTELS; EATING HOUSES; PLACARD—PENALTY FOR VIOLATION.—No keeper or proprietor of any bakery, hotel, boarding house, restaurant, saloon, lunch counter, or place of public entertainment, or any person having charge thereof or employed thereat, or any person furnishing board for others than members of his own family, or for any employes where such board is furnished for a compensation or as a part of the compensation of any such employe, shall keep, use, or serve therein either as food for his guests, boarders, patrons, customers or employes, or for cooking purposes, any imitation butter or cheese as defined in section 2 of this act, and in using or serving any substance designed as a substitute for butter or cheese as herein defined, he or they shall display and keep posted a card opposite each table in a conspicuous place where the same may be easily seen and read in the dining room, lunch room, restaurant, bakery, hotel, boarding house, saloon, or place of public entertainment, and place where such substance designed as a substitute is sold, used, or disposed of, which card shall be white and in size not less than ten by fourteen inches; upon which shall be printed in plain black Roman letters not less in size than one inch in length and one-half inch in width the words, "substitute for butter used here," or "substitute for cheese used here," as the case may be, and said cards shall not contain any other words than the ones above prescribed. Any person or persons violating the provisions of this section shall, upon conviction thereof, be punished by a fine of not less than twenty-five dollars, nor over one hundred dollars, or by imprisonment in the county jail for not over thirty days.

SEC. 9 PENALTY FOR VIOLATION.—Whoever shall violate any of the provisions of sections 3, 4, 5, 6 or 7 of this act shall, for the first offense, be punished by a fine not less than fifty dollars, nor more than one hundred dollars, or by imprisonment not exceeding thirty days; and for each subsequent offense, by a fine of not less than two hundred and fifty dollars nor more than five hundred dollars, or by imprisonment in the county jail not less than thirty days nor more than six months, or by both fine and imprisonment, in the discretion of the court.

SEC. 10. POSSESSION CONSTRUED; SEIZURES.—Whoever shall have possession or control of any imitation butter or imitation cheese, or any substance designed to be used as a substitute for butter or cheese contrary to the provisions of this act, shall be construed to have possession of property with intent to use it as a means of committing a public offense within the meaning of chapter 50, of title 25, of the code; *provided*, that it shall be the duty of the officer who serves a search warrant issued for imitation butter or imitation cheese, or any substance designed to be used as a substitute for butter or cheese, to deliver to the state dairy commissioner, or to any person by such commissioner authorized in writing to receive the same, a perfect sample of each article seized by virtue of such warrant, for the purpose of having the same analyzed, and forthwith to return to the person from whom it was taken, the remainder of each article seized as aforesaid. If any sample be found to be imitation butter or imitation cheese, or substance designed to be used as a substitute for butter or cheese, it shall be returned to and retained by the magistrate as and for the purpose contemplated by section 4648 of the code, but if any sample be found not to be imitation butter or imitation cheese, or a substance designed to be used as a substitute for butter or cheese, it shall be returned forthwith to the person from whom it was taken.

Approved April 24, 1894.

UNREPEALED SECTIONS OF CHAPTER 52, LAWS TWENTY-FIRST GENERAL ASSEMBLY.

SECTION 7. NO ACTION ON CONTRACT.—No action can be maintained on account of any sale or other contract made in violation of or with intent to violate this act by or through any person who was knowingly a party to such wrongful sale or other contract.

SEC. 9. DEFACING OR REMOVING MARKS.—Whoever shall deface, erase, cancel or remove any mark provided for by this act with intent to mislead, deceive, or to violate any of the provisions of this act shall be deemed guilty of a misdemeanor.

SEC. 11. APPOINTMENT OF DAIRY COMMISSIONER.—The governor shall on or before the first day of April of each even-numbered year appoint an officer who shall be known as the Iowa state dairy commissioner, who shall have practical experience in the manufacture of dairy products, and who shall hold his office for the term of two years from the first day of May following his appointment, or until his successor is appointed and qualified. Said commissioner shall give an official bond conditioned for the faithful performance of the duties of his office in the sum of ten thousand dollars, with sureties to be approved by the governor. He may be removed from office by the governor, with the approval of the executive council, for neglect or violation of duty. Any vacancy shall be filled by the appointment of the governor by and with the advice and consent of the executive council.

SEC. 12. SALARY; OFFICE; CLERK.—The state dairy commissioner shall receive a salary of fifteen hundred dollars per annum, payable monthly, and the expenses necessarily incurred in the proper discharge of the duties of his office; *provided*, that a complete itemized statement of all expenses shall be kept by the commissioner, and by him filed with the auditor of state after having been duly verified by him before receiving the same. He shall be furnished a room in the agricultural department of the capitol at Des Moines, in which he shall keep his office and all correspondence, documents, records and property of the state pertaining thereto, all of which shall be turned over to his successor in office. He may, if it is found to be necessary, employ a clerk, whose salary shall not exceed the sum of fifty dollars per month. Said salaries and expenses to be paid from the appropriation provided for in section 17 of this act. The commissioner provided for by this act shall hold no other official position under the laws of Iowa or a professorship in any of the state institutions.

SEC. 13. DUTIES; REPORTS.—It shall be the duty of the state dairy commissioner to secure, so far as possible, the enforcement of this act. He shall collect, arrange and present in annual reports to the governor, on or before the first day of November of each year, a detailed statement of all matters relating to the purposes of this act which he shall deem of public importance, including the receipts and disbursements of this office. Such report shall be published with the report of the state agricultural society.

SEC. 14. SECURING EVIDENCE.—The state dairy commissioner shall have power in all cases where he shall deem it important for the discharge of the duties of his office, to administer oaths, to issue subpœnas for witnesses and to examine them under oath, and to enforce their attendance to the same extent and in the same manner as a justice of the peace may now do, and such witnesses shall be paid by the commissioner the same fees now allowed witnesses in justices' courts.

SEC. 16. PROSECUTION; COST.—It shall be the duty of the court in each action for the violation of this act to tax as cost in the cause the actual and necessary expense of analyzing the alleged imitation butter or imitation cheese which shall be in controversy in such proceedings, provided that the amounts so taxed shall not exceed the sum of twenty-five dollars. It shall be the duty of the district or county attorney, upon the application of the dairy commissioner, to attend to the prosecution in the name of the state of any suit brought for violation of any of the provisions of this act within his district, and in case of conviction he shall receive twenty-five per cent of the fines collected, which shall be in addition to any salary he may receive, to be taxed as costs in the case.

SEC. 17. APPROPRIATION.—That the unexpended portion of the appropriation provided for by section 17 of the 52d chapter of the acts of the Twenty-first General Assembly, is hereby appropriated for the next biennial period, or so much thereof as may be necessary for the proper carrying out of the purpose of the act; but not more than one-half of said unexpended balance shall be drawn from the state treasury prior to the first day of May, 1889. The amount hereby appropriated shall be expended only under the direction and with the approval of the executive council. And all salaries, fees, costs and expenses of every kind incurred in the carrying out of this law shall be drawn from the sum so appropriated.

SEC. 18. Chapter 39 of the acts of the Eighteenth General Assembly of Iowa, and all acts and parts of acts in conflict with this act, are hereby repealed.

SEC. 19. This act being deemed of immediate importance shall take effect and be in force from and after its publication in the Iowa State Register and Iowa Homestead, newspapers published in Des Moines, Iowa.

Approved March 27, 1886.

Amendments approved March 28, 1888.

MILK TESTING LAW.

CHAPTER 47, LAWS TWENTY-FIFTH GENERAL ASSEMBLY.

AN ACT regulating the testing of milk.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. ACCURATE TESTS; PROCURE TEST BOTTLES; BURDEN OF PROOF; PENALTY FOR VIOLATION.—Any person by himself or agents, servants or employes, or any corporation, its agents, servants or employes who shall operate a creamery, cheese factory, or condensed milk factory in this state, and who shall use a chemical milk test for the purpose of determining the quantity of butter fat in milk purchased or received from the patrons of such creamery, cheese factory or condensed milk factory, is hereby required to use reliable and accurate tests, and no such tests shall be considered reliable and accurate, unless the same shall be clear oil and free from any foreign substance, and produce such measurements of butter fat as would result from the use of a standard Babcock milk tester. And every such person or corporation so engaged, and who shall use a chemical milk test, as aforesaid, is hereby required to procure from the state dairy commissioner's office one standard tube or bottle for testing milk, which shall be certified and marked, as provided in section 2 hereof, and which said test tube or bottle, so certified and marked as aforesaid, shall be kept for the inspection of such patrons and for the purpose of verifying the tests so used by such person or corporation.

And in any case of action in any court, arising between such person, corporation or factory and a patron thereof, the burden of proving such milk test to be reliable and accurate shall be upon such person, corporation or factory, and he shall show or establish that the test by him made, and the results therefrom, correspond with or are equivalent to the measurement of the butter fat which would result from the use of the standard Babcock milk tester.

Any person operating such creamery or factory, as aforesaid, or any agent, servant or employe of such person, or of any such corporation so engaged who shall violate the provisions of this section, shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not less than $50, nor more than $100, or by imprisonment in the county jail not more than thirty days.

SEC. 2. DUTIES OF DAIRY COMMISSIONER.—It is hereby made the duty of the state dairy commissioner to keep on hand a supply of standard Babcock test tubes or bottles for testing milk, and he shall furnish to any person or corporation desiring the same, one such tube or bottle, and upon request shall certify the same to be accurate, reliable and standard, and shall place thereon the letters "D. C." as a permanent mark thereon, such tube or bottle so furnished to be at the actual cost thereof.

SEC. 3. This act being deemed of immediate importance shall take effect and be in force from and after its publication in the *Iowa State Register* and *Des Moines Leader*, newspapers published in Des Moines, Iowa.

Approved April 24, 1894.

REGULATIONS OF THE IOWA STATE BOARD OF HEALTH.

RELATIVE TO DISEASES IN FAMILIES—OR HOMES OF, OR DEALERS IN MILK, CREAM, BUTTER, OR CHEESE.

From revised edition for 1896:

When Asiatic cholera, small-pox, diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), leprosy, yellow fever, typhus fever, measles, or any other contagious disease exists in any house or dwelling place of a dealer in or seller of milk, he shall discontinue and cease to give, or sell, or distribute milk to any person, or to creameries or butter factories, or in anywise handle such milk, until a permit is granted therefor by the mayor (or clerk), countersigned by the health officer. And no person who attends cows, and the milking, or who has the care of milk vessels or the sale or distribution of milk, shall be permitted to enter any premises or place wherein exists any of the diseases named herein, nor have any communication, direct or indirect, with any person who resides in, or is an occupant of such infected place; nor shall any milk or butter be given away, sold or distributed from such infected place.

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ELEVENTH ANNUAL REPORT

OF THE

STATE DAIRY COMMISSIONER

TO THE

GOVERNOR OF THE STATE OF IOWA.

FOR THE YEAR 1897.

W. K. BOARDMAN,
State Dairy Commissioner.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

DES MOINES:
F. R. CONAWAY, STATE PRINTER.
1898.

LETTER OF TRANSMITTAL.

To His Excellency, Francis M. Drake, Governor of Iowa:

SIR—In compliance with law, I have the honor to submit herewith the Eleventh Annual Report of the Department of State Dairy Commissioner for the year ending October 31, 1897.

Very respectfully,

W. K. BOARDMAN,
Dairy Commissioner.

REPORT.

OLEOMARGARINE.

The introduction and development in this country, of an artificial substitute for pure butter, manufactured in imitation and in the semblance of butter, now designated by the United States government as oleomargarine, was the most important and direct factor in the establishment of the Department of Dairy Commissioner in Iowa, therefore it would seem that we are under some obligation to the very enemies whom we have fought so hard for the benefits—other than those realized from correcting the evil caused by the traffic in these imitations—that have resulted from the establishment of this department.

The dairy department was originally established to guard and assist in the enforcement of all laws aiming at the regulation and control of the manufacture, sale, and use of substitutes for butter, to the end that our dairy interests might thrive and maintain their rightful positions in the development of the resources of our state, and further to protect the citizen from rank deception that was being perpetrated. The accomplishment of these objects has required a long and difficult warfare, necessitating from time to time the amending of old, or the enactment of new laws, when more radical means were demanded to protect the dairy interests of our state from heavy loss and ultimate ruin. It is not surprising that the founders of the original oleomargarine law of this state, which also contains the provision establishing the dairy department, did not foresee the weakness of the enactment, and with what ease fraud and deception, undiscovered, could be carried on under its provisions. The lawmakers of all other states that undertook, early in the conflict, to regulate and control this traffic, fell into the same error; namely, by the use of brands and marks to compel the imitation to be sold and used for what it really was, and not for a genuine article; or, in other words, to protect the genuine from competition with fraud, and the consumer from deception. Not until the provisions now upon our statutes, known as the Anti-color law, were enacted, could the advancement of these frauds be checked for any permanent length of time. Suppressed for a time in one locality, it would only seem to stimulate new efforts to establish them elsewhere. The law known as the Anti-color law became operative July 4, 1894. The wisdom of this legislation was apparent the very day the law became effective, and has demonstrated, not only to the citizens of Iowa, but to those of all other sections of our country, the effectiveness of proper laws when rigidly enforced. It is with no little satisfaction that other states have followed the example of Iowa and enact laws containing the very provisions that have been of so much value in the suppression of this illegitimate traffic. The few states now without effective laws should avoid those enactments that, on paper, seem to suit the needs, but have proven, wherever enacted, to be of no value whatever, and should strike right at the root of the whole subject by the provision of the anti-color features. They should not be misled by the terms calling for marking and branding.

As has been before stated, this department was originally created to enforce laws against the oleomargarine traffic, and much attention and space has been devoted to that subject in my previous reports, but now there seems to be but little further information to give upon the subject as far as it directly pertains to violations in our state. There is not at the present time, nor has there been during the United States fiscal year ending June 30, 1897, a single United States special internal revenue tax or license issued for the sale of oleomargarine in Iowa. In fact the last one to be issued bore the date of September 11, 1895. When it is considered that three and one-half years ago, there were 108 such special tax in force in Iowa, and the fraudulent sale of oleomargarine bearing fancy brands of creamery and dairy was being extended to all parts of the state, the beneficial results of this anti-color law is at once most apparant.

The suppression of these fraudulent sales in this state, as well as in many others, during the past three years, has been influential in developing the dairy industry of our state. This development and increase, resulting in a larger output of fine butter, should cause our people more than ever to take an interest in what has been and may be accomplished in other states to reduce and suppress the frauds that permit the placing before the consumer of an article that is usurping the right of pure butter, of which we now have from eighty to ninety million pounds annually that must seek a market beyond the borders of Iowa. In the marketing of this vast amount of butter we expect and court honest competition, but in addition to this we do not wish or be obliged to meet competition that is based entirely upon fraud and deception. The enactment of effective laws, and the rigid enforcement of them by all states, is so necessary and essential to the advancement of the dairy industry, that Iowa is at the present time more interested in and can be more largely benefited by what can be accomplished outside than within their borders, yet it is still of the utmost importance that present laws be well guarded and strictly enforced.

In my last report, I referred to the two failures of great importance that have occurred since the oleomargarine fight had begun in earnest. One was the defeat in Illinois, and the other a partial success in Michigan. Both of these states have now been redeemed from the enemy and brought into line, with laws having as their foundational feature the anti-color clause. It now remains for our dairy friends to carry the war into Indiana and Kansas, redeeming those two important states and placing them in the same class with their more fortunate neighbors. It is now conceded that in Indiana oleomargarine is meeting with larger consumption in many localities than butter, but in no instance can it be shown that it is sold or used other than through deception as butter. The dairy cause in Michigan is fortunate in having a dairy and food department to enforce the new statutes. Much has already been accomplished in driving the traffic from that state, and notwithstanding the opposition that the commissioner is meeting from some quarters, where it should have been least expected, we look for an early realization of a complete victory for honest dairy products in Michigan. Notwithstanding Nebraska has accomplished much by the enactment of the anti-color law, her lawmakers still seem to be unmindful of the importance of a dairy department with appropriations adequate to carry on the work. The dairymen and creamerymen of that state should insist on a further recognition of their rights, as the state is now being rapidly developed along the dairy lines. Missouri, with a law modeled after the Iowa law, has been passing through the necessary delay of court proceedings. The enforcement of the anti-color law is in the hands of the state board of agriculture. The secretary of this board and a special agent have been active in bringing offenders before the courts, and early in the season a decision was handed down by the supreme court of the state upholding the constitutionality of the law, thus being in full accord with the United States supreme court and all state courts where the validity of similar enactments have been determined. In addition to the court decisions of Missouri and Michigan, which are in line with all other opinions, the past year has brought forth a decision from the New York courts which will be far-reaching in its assistance to detect violators of the law. This decision grants state officials power to investigate and examine railway and express books for the purpose of discovering evidence when suspicion points to the violations of the anti-color law by the shipment into the state of oleomargarine manufactured in imitation of and in the semblance of butter. It is stated that this ruling carries with it the final decision of scores of cases, the aggregate fines of which may equal $1,000,000. The result and effect of this decision on the manufacturers and shippers from other states will be carefully watched by the dairy people, for it would seem that without the aid of the transportation companies the traffic into states having similar laws to those of New York would be much more difficult and hazardous. It was a day of rejoicing, not only to the honest citizens of Illinois, but throughout the entire country, when repeated defeat had been turned to victory; for the hardest and most important fight that has been waged against fraud for a number of years was conducted last spring in the Illinois legislature and resulted in a complete victory for honest butter. When it is remembered that three-fifths of all the oleomargarine manufactured in this country has been produced in that state, and that one-third of all the licensed retailers doing business were located in that state, it must be seen how valuable was the territory to the oleomargarine people, and that with such large interests they would leave no stone unturned to defeat a measure that would ultimately close up their business in that state. This law became effective July 1, 1897. Since that time the usual delay caused by court procedures has been indulged in by those violating the provisions of the law. This was to be expected, and in fact that two of the largest manufacturers have discontinued the business, is really more than the friends of the law could have expected; and in addition to this, that one of these manufacturers after discontinuing an immense oleomargarine business has engaged in the legitimate butter business, distributing immense quantities of honest butter into a territory where previously they shipped oleomargarine. It should not be expected that the enemies of honest butter interested in the production of imitation will do less in that state than has been done in all other important sections of our country; therefore the enforcement of the law is only passing through the stages that have been required in all other states to a more or less degree having similar laws. It is well to remember that while many of the eastern and middle states have been fighting against this traffic through all the courts, in Illinois there has been no conflict except that resulting from the attempted enforcement of the United States revenue law. If violations are still carried on, in states like Massachusetts, Pennsylvania and Ohio, to an extent requiring the persistent attention of officials and the courts to bring the offenders to justice, what more could be expected in Illinois, when the whole field, as far as court decisions and proceedings are concerned, is open to contention? With these conditions and the delayed progress of courts is it any wonder that the manufacturers are still defying the law and have been able to induce large numbers of retailers to provide themselves with licenses and handle their yellow goods? That partial success has followed their efforts must be admitted, if we are to judge from the number of licenses issued to November 1, 1897, as compared with the same time the previous year, when two of the largest manufacturers, now out of that line of business, were then still operating their large factories.

There was a reduction in that state of 240 in the number of United States licensed dealers, and a decrease of 2,295,150 pounds of oleomargarine manufactured for the quarter ending September 30, 1897, as compared with the same quarter for 1896. This reduction in the manufactured product was equal to almost 50 per cent. With this showing, the friends of the law were greatly encouraged, but with the month of October, the oleomargarine manufacturers, encouraged by the slow process of law against them and the advanced price of butter, were able to increase the number of dealers to an extent far beyond even their own expectations, and at the close of the month a record of 174 licenses against 101 for the same month of the previous year was attained. Notwithstanding the large increase in the number of dealers, a decrease of 595,950 pounds of oleomargarine as compared with October, 1896, was realized. When the four months ending October 31, 1897, are considered, we find a net reduction of 167 licensed dealers, and 2,891,800 pounds over the corresponding months of the previous year. This reduction occurred during the first four months of the operation of the new anti-color law, and when the conditions that have previously been referred to are considered, the friends of honest butter should take courage and continue the warfare with renewed energy until the fraudulent traffic is further diminished and finally driven from that state. The National Dairy Union, which has accomplished so much in the past, as ever before, now stands ready to continue its effective work, and should be maintained and encouraged by all those interested in having proper dairy laws enacted and enforced.

The dairymen of Iowa, as far as the enactment and enforcement of the oleomargarine laws in the state are concerned, are practically relieved from any direct contribution or uneasiness, and for this reason they should liberally apply support and influence to other sections where the violations of similar laws affect their interests. If we are to enjoy the security in the future that we now have, it is important that the inroads the enemy is endeavoring to make in other territory should be checked, for if they are successful throughout the field that they are now so actively trying to withhold, will they not later turn their attention to our state? In such an event, to maintain our present proud position, which undoubtedly would be done, would require great effort and liberal assistance. "Forwarned is forearmed," therefore every Iowa dairyman should consider each fight waged against honest butter, his fight, and with the National Dairy Union, as the general prosecutor, it should have liberal support and contribution, and to this end in the name of this department an appeal is hereby made in behalf of the organization.

BENEFITS DERIVED FROM THE CREAMERY SYSTEM.

The past year has seen unusual activity and interest manifested on all subjects pertaining to the dairy and creamery. This interest has not been confined to Iowa alone, but has developed in all sections of our country, even to some localities where a few years ago the merits of the dairy cow were unknown or not considered worthy of attention. The financial conditions through which this country has passed during the last four years has, no doubt, had its influence in promoting the present interest and investigations that center around this important branch of agriculture. The uncertainty of remunerative prices for the ordinary crop of the farm, with the risk of a partial or total failure from one cause or another has convinced many that some change in methods of farming throughout our large agricultural districts was necessary if prosperity was to be expected. The fact that some change should be had has been advanced by the agricultural press and leading thinkers, a majority of whom now advocate a more diversified method of farming in a large part of a territory that heretofore has been used exclusively for grain raising. To nearer meet the important requirements for diversified farming, the cow, the dairy and the factory have attracted the attention of many in all parts of our country. It is now recognized that this system of farming conducted on the most economical and profitable basis must place the cow as the center of the system, with the butter or cheese factory as near at hand as possible, that the by-product of the milk may be returned and fed upon the farm. It may be admitted that with some advanced dairy farmers the factory is not essential to success, they being so well skilled in the manufacture and marketing of their product as to be independent of the creamery; but these exceptions are so rare that a factory in any dairy community cannot well be dispensed with.

The cow as the center must be of the kind and breed most adapted to assist in bringing about the desired change from marketing the hay and grain at the shipping station, to a home market, which consists in these products, and other rougher feeds, being converted principally into butter, beef and pork. To accomplish this, the cow, in addition to furnishing a fair quantity of rich milk for ten months of the year, should raise a number one calf, that will be suitable for the dairy or the feed lot. The care and management of the calf where diversified farming is to be made most profitable, is of the utmost importance. The future dairy cow depends upon the calf of to-day and her treatment. The future market on the farm for grass, corn fodder, hay, grain and corn, to a large extent, depends upon the male calf of to-day, and his treatment. With live stock to consume the farm products there would be no hard times and where corn cribs at shipping stations are now bursting with their contents, shipments would consist of the finished products, such as choice creamery butter, and fat stock of all kinds. In a change such as is here contemplated, it should not be expected that the ideal cow can at all times be had, but this should not be a sufficient reason to continue in the old rut. The best that can be had should be selected, and from them with proper breeding and handling, a herd of improved stock can soon be grown for the purpose intended, that will be better than can be obtained otherwise. The development of the present creamery system in parts of our state has been slow and uncertain, the main cause being the mistaken idea that when the production of milk for the factory was made a factor, the beef side of the farming would have to be discontinued, as a good feeder could not be expected from a calf raised on separator milk. This line of thought has had an injurous effect in two ways: first, the number of cows that should have contributed to the creamery have not been maintained; and second, the feed lot has suffered, as a cow could not profitably be kept for the chance of a calf alone. Thus the consumptive demand on the farm has not kept pace with production, necessitating a market elsewhere, to relieve the large surplus of the principal crops of the state. To correct this unfortunate condition and have success follow, in those sections of the state where the beef interest must be recognized, requires the keeping of the right kind of a cow and that her calf be not neglected. The return of the separator milk in a good condition to be fed, with a knowledge of how to feed it, is necessary to properly care for the calf. To have the milk in a proper condition depends much upon the treatment at the creamery, but, when heated to a temperature of about 160° F. and delivered from a tank kept as clean as a churn should be, the creamery has then accomplished its part in this connection, providing none but pure sweet milk is received. The patron has much for which to be responsible, in the care of the separator milk, and if he neglects to properly care for milk that he delivers to the factory, it can be assured that the skimmed milk will also be neglected so as to materially injure its value when fed to the calf. All vessels and utensils used in connection with this class of milk should be clean and free from germs that hasten fermentation. The common swill barrel should not be the reservoir for separator milk, unless it is intended for the hog alone, and even in that case, it is doubtful if as much good can be accomplished as would be should cleanliness be observed. When the milk is properly delivered at factory and returned to the farm the important question then is, how best to feed it? This subject is so well treated in an article from "Wallaces' Farm and Dairy," that it it is, in part, reprinted.

The reason why a calf raised on milk skimmed by gravity, or cream raised by setting the milk in cold water, is better than separator-milk, is that it has a portion of the butter fat in it. The reason why separator milk makes a poor calf is a similar one, namely, because it has no butter fat in it. If this separator milk is sour, or worse still, sweet one time and sour another, the reason why it grows a poor calf is even more apparent, for nature feeds the calf the sweet, warm milk, and when we deviate from nature we always get a rap over the knuckles. It is impossible to grow a calf by hand with separator milk alone, fed sometimes sweet and sometimes sour. It is impossible to grow a calf by hand fed only on separator milk, even if sweet, warm and often. The reason is, we have destroyed the balanced ration which nature provides. We have taken away the butter fat, and fat in some form or other the young calf must have. The problem, therefore, for the farmer is to consider how he can balance up the ration by substituting cheap fat in place of the high priced butter fat, and the further problem, how he can imitate nature in feeding that calf with its balanced ration, sweet, warm and often, as the system requires.

The Ames Experiment station has conducted three valuable experiments, intended to be lessons to the farmers in Iowa, and a similar work is done in most of the adjoining states.

The third experiment is reported in Bulletin 35, the second in Bulletin 25, and the first in Bulletin 19; these three bulletins should be in the hands of every western farmer who raises even one calf a year. They can be had by all Iowa farmers free on application to Professor Curtiss, and if you do not get these bulletins it will be an evidence to us that you don't care one cent's worth as to what the agricultural station, with its expenditure of several thousand dollars each year is doing for you and me. The result of all three experiments show conclusively that corn meal is the cheapest feed with which to balance up the separator milk ration. Many farmers are making the mistake of putting oil meal in with the separator milk, with the idea of restoring nature's balanced ration. We have protested against this for a good many years and have given our reasons; namely: that oil meal is about as unbalanced a ration as skim milk itself. Both are too highly nitrogeneous, that is, they have too much of the flesh forming element, and compel the animal to burn this more expensive and costly element in lieu of the more expensive and valuable element which nature intended they should burn to keep up the animal heat. Oil meal is the residue of flax seed after the fat is taken out. This is an admirable balance for corn, when fed to the growing animal, but is the poorest sort of a balance for skim milk when fed to the calf. Hence, in every case in these three experiments it has cost more to raise a calf on separator milk and oil meal than it does on either oat meal and skim milk, flaxseed, corn meal and skim milk, or corn meal and skim milk alone. For example, the cost of feed per pound of gain when oil meal and milk was used was $2\frac{1}{4}$ cents, on oat meal and milk $2\frac{2}{10}$ cents, on flaxseed, corn meal and milk (10 per cent flaxseed) $2\frac{3}{10}$ cents, and on corn meal and milk alone 2 cents. It so happens that corn meal is the cheapest food that can be given to the calf in connection with separator milk. It is not a balanced ration in itself by any means, but the separator milk balances it up so that if a farmer were feeding his calves corn meal, the ration would be greatly improved by adding separator milk; he could not get the full value of it unless he balanced it up with corn meal. Flaxseed, corn meal and milk in the proportion of nine of corn to one of flaxseed is the next best ration, the difficulty being, however, that few farmers grow the flaxseed, and still fewer are near a mill where it can be ground, requiring, as it does, a different mill from that required for ordinary corn, hence, it may as well be dropped out of consideration. Oats is the next best, but there is no need of feeding oats when you have separator milk, and hence it must be put down that the cheapest thing on which to grow calves with separator milk is corn meal.

The separator milk must, however, be sweet and not rendered indigestible by overheating in order to keep it sweet.

Farming is a business, and requires business principles in its conduct. The success of many business enterprises has been acquired from the estoppage of leaks and the utilizing of material that had previously been allowed to go to waste. In the adoption of the system under discussion, nothing on the farm would be wasted. All can be utilized and made to do its part to insure a profit to an enterprise that would otherwise be less profitable or result in absolute loss. With all fodder and grain, including the by-products of the milk, fed on the farm, the loss of soil fertility would be reduced to a minimum, thus extending the time indefinitely when it will be necessary to make use of foreign fertilizers. The unfavorable results brought about by the unfortunate financial condition through which this country has recently passed should have attracted the attention of the grain shipping and fodder wasting farmer to an extent that an important lesson was taught him; for, while he was conducting his business at a loss, and on credit extending from one harvest to another, and, in case of crop failure, being obliged to ask further extension of credit, he found his more fortunate neighbor receiving and depositing monthly milk checks, unmindful of the hard times, other than what he learned from his neighbor or through the press. The development of the dairy interests in our state during the past year has been large, and has expanded the industry into localities that heretofore had not enjoyed the benefit derived from the dairy branch of our agricultural system. In this extension, sections of the state that heretofore had been devoted entirely to grain and stock raising have recognized the advantage of the dairy, and have combined their interests with the dairy cow, who has never been the cause of a mortgage being placed upon the farm, but who has been instrumental in removing many. The increase in the number of creameries for the past year is larger than for any like period for a number of years. The fact that a large per cent of this increase has been made outside of what has been considered the dairy belt of our state, goes to show that those sections are regarded as a good field for dairy and creamery development.

Many of the leading railway lines of the state, after careful study and investigation of the advantages to be derived from diversified farming, with the cow as the center, have been instrumental in bringing before the farmers and business men located in territory traversed by them, information intended to establish the advisability of such a system, and at many points along their lines, where in the past dairying was unknown, or a poor quality of butter was bartered at the cross-roads store, now can be found modern creameries in full operation, meeting with a success that makes it the boon of the farmer and the pride of the community. In the encouragement extended by railways, or by others, for creamery building, one thing should at all times be kept in mind, and that is that a creamery, no matter how well equipped or managed, without proper support cannot long exist, and usually when a failure results, successful dairying in that community is set back a number of years. The fact that creamery failures are becoming less and less each year is a strong indication that more care is being exercised, and more honest methods employed in their establishment, than was formerly known. The success or failure of a creamery in the newer sections of our state will depend largely upon whether the farmers are going to still further adopt and continue a system of farming along diversified lines, having a safe and sure future; or, when prices for grain advance, or the beef side looks more promising, neglect the dairy calf and discontinue the production of milk, returning to the system of continuous cropping, necessitating the marketing of their grain otherwise than on their own farm. The lesson of the past should be warning enough, for it demonstrates in our state that those sections which have continued along the advanced lines have been the most fortunate, and their people have no desire to shift from their established course to those features that may seem at different times to promise better results, but which, by changed conditions, may soon be overdone and again be found unprofitable.

It is not surprising that with the increased interest manifested, and the fast extension and development in dairying throughout our own and our sister states, a degree of apprehension is advanced by some, fearing the business will be overdone, and the production of milk and its products increased to a point where their disposition will be made without profit to the farmer. If the conditions in Iowa were not so favorable for this branch of agriculture, the danger referred to might be made ground for a more thorough investigation, but when it is known and acknowledged that in no section in this or any other country can a pound of fine butter be produced cheaper than in our state, the necessity for more careful and thorough investigation is shifted to those engaged in the business and less favorably situated, for in the event of prices reaching a point so low as to require a reduction in the supply of dairy products it will be most felt in those sections, and, consequently, the contraction of the industry must naturally begin there.

The question of supply and demand was treated to a large extent in my last report. The same reasons now exist, only to a larger degree, in determining the advisability of further developing the dairy industry. The danger of over-production was shown to be very slight, provided our markets could be extended by the supplanting of oleomargarine, and the development of an export trade, together with an increased consumption in our home markets resulting from improved quality. These conditions have been furthered to a more or less degree. The past year has seen a decrease of over five millions of pounds in the production of oleomargarine, with prospects of a much larger decrease for each year until the business is reduced to a point where it will not materially affect the dairy interests. The suggestions offered and advanced in my previous report looking to the future development of the export trade have been more than realized under the able and earnest efforts of Hon. James Wilson, secretary of the U. S. department of agriculture, assisted by Hon. Henry E Alvord, chief of dairy division connected with that department.

Export trade in butter has been neglected in the past to an extent that in the leading markets of Europe, American butter, with the exception of poor grades, was unknown, but through the agricultural department at Washington and individual efforts, the finest make of American butter has been introduced in Liverpool and London, and information and facts pertaining to the requirements of these markets has been one of the main features connected with the work of the dairy division. From some counties in our state individual shipments of choice creamery butter by the carload have been exported to England, and during the months of greatest productions large exportations were made and prices realized that compare favorably with those obtained for butter for storage purposes and home consumption. It was not until the markets of this country improved to a point that made exportation unprofitable that it was discontinued, but it must be admitted that the taking of large quantities for export relieved the stock in this country to an extent that materially assisted in advancing prices earlier in the season than usual and to an extent that otherwise would not have been had. If the make had not been materially reduced on account of the drouth of the autumn months, extending over the dairy districts, it is more than likely that prices would have remained low enough to have made the export market quite desirable, but until fall and winter dairying is developed to a much larger degree, the necessity of an export trade for these months is not so important as during the balance of the year. This fact is one that will interfere in our establishing a regular trade with our foreign cousins, for one of the main features of our meeting competition and developing a demand in any market, is to always have our goods or wares before the people. The fact that Australia and New Zealand are virtually out of the English market during the months that we need it most, will assist to a large extent in making room for our goods. Our government can be of still greater service to this industry by establishing a system of inspection similar to that connected with the exportation of meats, by which all dairy products will be received at destination bearing a guarantee that they are exactly as represented. A national law should be enacted protecting the brands and trade-marks from being used to the detriment of the individual or state. The government should further assist to an extent that the transportation service to foreign countries will compare favorably with those of our competitors, and that transportation charges will not force large quantities of our shipments to be cleared at foreign ports, as was the case, we are sorry to state, during the past season.

NEW YORK BUTTER MARKET.

One important use to be made of statistics is that of comparing facts one year or portions of a year with another. From the following table we find the average price of western fancy creamery butter in the New York market, where about 70 per cent of our shipments are consigned, for each month of the past seven years, together with the average yearly price for the same length of time. From this table the price of butter for the year 1897 as compared with that of 1896 is virtually the same, and indicates upon first glance that the market has been of an unchanging nature; but when the corresponding months of the two years are compared, a difference exists that can be accounted for only by an understanding of the conditions prevailing during the respective seasons of the two years.

The first four months of the present year, ending November 1, 1897, when compared with the corresponding months of the previous year, with the exception of one month, show a decided falling off in the averages, which is undoubtedly because of the favorable weather and open winter, and the abundance of cheap feed, both of which aided in an increased production of choice butter. In April, 1896, the average is .023 cents per pound higher than for April of 1897. This, no doubt, was brought about through a decreased make of butter, caused by the condition of the roads and prolonged rain, which made them impassable in many sections and prevented the delivery of milk to many of our creameries. The loss throughout the state of Iowa from this cause alone represents a sum that, if rightly applied, would go far towards putting many of our highways in a condition that would prevent a repetition of the conditions of last spring. There is no interest more directly concerned in the improvement and maintenance of good roads than that of the production of milk or cream as delivered to our 891 creameries.

By again referring to table No. 1 it will be seen there is but a slight difference in the averages for the months of May, June and July. From August to the end of the year there is a large increase in favor of 1897. This may be explained, first, in that the export demand has taken large blocks of June butter from our market which under other circumstances usually came into direct competition with fresh goods, and also, the stock of fresh creamery was affected, as compared with the previous year, by the partial drouth during the fall months. In a comparison of the averages for different months of the year, October, with an average of .2290 cents, was the highest, and June and July, with .15 cents, were the lowest. The average price for the seven years is .2308, being .0425 cents higher than the average for 1897. We are safe in assuming that the lowest average that will be realized for some time to come has now been reached, and with favorable conditions and improvement in our financial affairs, a gradual improvememt in prices can be expected.

TABLE No. 1.

The following table gives the average monthly price of western fancy creamery butter for each month during the past seven years, in the NewYork market, and average price for each month for the seven years, and the average price for the entire period.

MONTH.	Twelve months ending Nov. 1, 1891.	Twelve months ending Nov. 1, 1892.	Twelve months ending Nov. 1, 1893.	Twelve months ending Nov. 1, 1894.	Twelve months ending Nov. 1, 1895.	Twelve months ending Nov. 1, 1896.	Twelve months ending Nov. 1, 1897.	Av. per month for seven yrs.
November	$.2740	$.2590	$ 3100	$.2790	$.2510	$.2330	$.2112	$.2596
December	.2912	.2887	.3112	.2840	.2440	.2500	.2250	.2706
January	.2812	.3075	.3387	.2562	.2519	.2266	.1900	.2646
February	.2862	.2975	.2875	.2700	.2394	.2000	.2050	.2550
March	.2730	.2665	.2925	.2250	.2670	.2185	.1900	.2475
April	.2694	.2869	.3112	.2287	.2000	.1650	.1880	.2356
May	.2280	.2125	.2455	.1760	.1785	.1572	.1580	.1920
June	.1825	.1944	.2131	.1831	.1794	.1550	.1500	.1800
July	.1800	.2210	.2160	.1850	.1770	.1505	.1500	.1827
August	.2090	.2220	.2360	.2360	.1980	.1571	.1675	.2082
September	.2475	.2525	.2750	.2500	.2125	.1600	.1930	.2372
October	.3000	.2687	.2941	.2540	.2294	.1850	.2290	.2515
Av. val. per lb. for each yr.	$.2520	$.2594	$.2776	$.2350	$.2190	$.1882	$.1885	$.2308

BUTTER SHIPMENTS EAST FROM CHICAGO.

The following is a table which is of essential interest in connection with this subject. The figures given are obtained from a reliable source and tend to show the pounds of butter forwarded east from Chicago and originating west, north and south of the shipping point. It will be seen that there is a net increase of 9,589,120 pounds of butter over 1896, and in the months of August and October a decrease over the corresponding months of 1896 of 5,651,200 pounds, while in the comparison of 1895 with 1896 there is no decrease in the shipments by months, and a net increase of 29,088,400 pounds for the year. The largest increase in one month over another in the years 1895 and 1897 is in June, 1897, being 8,042,960 pounds, and April and July, each with over 5,000,000 pounds. A large part of the butter thus consigned east from Chicago is made up from Iowa shipments, and since the amount is increasing from year to year the demand for Iowa butter is likewise affected.

Table showing net pounds of butter forwarded east from Chicago by railways, arranged by months, with total for the three years ending November 1, 1895, 1896, and 1897, and increase of 1896-1897.

MONTHS.	1895.	1896.	1897.	INCREASE 1895-1896.	INCREASE 1896-1897.	DECR'SE 1896-1897.
For the year	139,815,280	168,903,680	201,920,000	29,088,400	38,625,520	5,651,200
November..... .	8,106,000	8,860,320	11,988,000	754,320	3.127,680	....
December	8.741,040	9,255,120	13,298,000	514,080	4,042,880	....
January.	11,111,520	12,999,840	13,670.000	1,888,320	670,160	....
February....	8,663,520	10,573,920	13,772,000	1,910,400	3,198,080	....
March.......	8.697,360	10,550,400	14,552.000	1,853,040	4.001,600	....
April	7,912,000	10.454,480	15,564,000	2,542,480	5,109,520	....
May..................	13,302,240	17,650,080	21,594,000	4,347,840	3,943.920	....
June.	17,359,440	19,619,040	27,662,000	2,259,600	8,042,960	....
July..................	16,932,720	20,027,280	25.516,000	3,094,560	5,488,720	....
August	15.240,960	19,741,680	17,792,000	4,500,720	....	1,949,680
September	10,516,800	13,944,000	14,986.000	3,427,200	1,042,000	....
October.	13,231,680	15,227,520	11,526.000	1,995,840	....	3,701,520
Total.	139.815,280	168,903,680	201,920.000	29,088.400	38.677.520	5,651,200

IOWA CREAMERIES.

The information contained in tables numbering 2 to 10, inclusive, have been compiled largely from reports obtained directly from the creameries. The system adopted in collecting this information was to forward to each creamery proprietor, manager or secretary a blank to be filled out and returned to this office. The following is a reprint of the blank used in 1897:

CREAMERY REPORT.

1. Name of creamery..
a Name or location of skim station or stations........................
b State the name of creamery or creameries where each skim station delivers cream ....
2. Creamery located at or near what town?..........................
Creamery located in what county?..................................
a Skim station located at or near what town?.........................
Skim station located in what county?..............................
(If more than one skim station, designate by numbering 1, 2, 3, etc)
b Postoffice where creamery mail is received..............County......
c Shipping station?...............On what railroad?...............
What is a fair valuation of plant? $.... ....
Average value of each skim milk plant? $..........................
a When was creamery built? 18....................................
b When was skim plant or plants built? 18.........................
(If more than one, use number of station, with year built, in making answer.)
5. Is creamery operated by individual or firm? ....
a Is creamery operated by farmers' co-operative association?.........
b Is creamery operated by a stock company on the co-operative plan?..
c Is creamery operated by a stock company where by-laws provide for annual or semi-annual dividends on stock?........................
d Is creamery operated by owner?...If not, from whom is it leased?...
6. Name of present proprietor or firm?................................
Postoffice address? ....
a Name of president or secretary?...................................
Postoffice address?..
b If creamery or skim station has changed ownership within the past year, state name of former owner or owners?....................

c If creamery was formerly operated as a skim station, or cheese factory, state by whom operated and when change was made?........ ....When changed?..................................

d If skim station was formerly operated as creamery or cheese factory, state by whom it was operated, and when change was made?...... ....When changed?..................................

7. Has the creamery an official dairy commissioner's test bottle?......... Number engraved on same?........

a If more than one bottle is used, give the name of creamery or skim station and number of bottle used by each?......................

8. System of operating: As separator?...... As gathered cream?...... As combined separator and gathered cream?.....................

9. State number of separators in use?.......... Give name of each, and whether turbine or belt? Name of separator?..................

a If a milk tester is used, give name of tester and also name of manufacturer? Name of tester?........... Manufacturer?..........

10. Did you manufacture cheese during any part of the year ending May 1, 1897?........

11. State by the word "yes," after each question asked below, the plan used in receiving milk and cream:

a Is the milk received on the relative value plan (by test)?............

b By the hundred or pool plan?........ *c* Is cream received by the gauge or inch?........ *d* By the oil test?........ *e* By the Babcock test?........

12. How many of your patrons furnish cream from hand or farm separators?........

13. Was the creamery operated the entire year ending May 1, 1897?....... If not operated the entire year, check the month or months the creamery was closed: 1896—May, June, July, August, September, October, November, December. 1897—January, February, March, April.

14. Name of head butter-maker?...

a When one of the firm, give full name?...................................

b Has butter-maker taken a course in dairying at a dairy school?...... If so, where?...........................

c Monthly wages paid head butter-maker for year, or any part of the year, ending May 1, 1897: During winter months? $............. During summer months? $...........

d If uniform, state amount for the entire year, or any part thereof: $...........

e Monthly wages paid first helper? $.............. Number months employed?........

f Monthly wages paid second helper? $............ Number months employed?........

15. State the average number of persons, if any, other than patrons employed in collecting milk?....... Cream?....... Total?......

a State yearly expense of collecting milk? $...... Cream? $...... Total? $.......

16. Give number of pounds of milk received and made into butter from May 1, 1896, to May 1, 1897? ....

(In case creamery was not operated the entire year, answer question for time during the year creamery was operated.)

a State the average per cent of butter fat and the average pounds of butter made per 100 pounds of milk for each month of the year ending May 1, 1897.

(Answer both questions, if possible; if not, answer the one of which you have a record.)

1896.—May ------per cent butter fat;--- pounds butter made per cwt. milk
June ------per cent butter fat; ---pounds butter made per cwt. milk
July-------per cent butter fat;----pounds butter made per cwt. milk
August----per cent butter fat;----pounds butter made per cwt. milk
September per cent butter fat;--- pounds butter made per cwt. milk
October---per cent butter fat;----pounds butter made per cwt. milk
November-per cent butter fat;----pounds butter made per cwt. milk
December-per cent butter fat;----pounds butter made per cwt. milk
1897.—January---per cent butter fat;--- pounds butter made per cwt. milk
February--per cent butter fat; ---pounds butter made per cwt. milk
March ----per cent butter fat;----pounds butter made per cwt. milk
April -----per cent butter fat;----pounds butter made per cwt. milk
Yearly average--per cent butter fat;----pounds butter made per cwt. milk

17. State the average yearly cost per pound of manufacturing separator butter, including the cost of package, but not the cost of delivering milk?-----------------cents per pound.

a State yearly average cost of manufacturing gathered cream butter per pound, including the cost of package and the gathering of cream?-----------------cents per pound

b Give the number of net pounds and kinds of butter manufactured from May 1, 1896, to May 1, 1897, or part of the year operated, as enumerated below: Number pounds of separator?------------lbs. Gathered cream?------------lbs. Combined separator and gathered cream?------------lbs. Total?------------lbs.

c Give the estimated cash value of all butter manufactured from May 1, 1896, to May 1, 1897, or part of the year operated, after deducting the expense of shipping and selling? $-------------------------

18. What part or per cent of this butter was furnished to patrons?
----

a What part or per cent of this butter was marketed for consumption in Iowa?---

b What part or per cent of this butter was shipped to points outside of the state? ---

c State what amount of butter was shipped to the following markets for the year ending May 1, 1897:

New York ---lbs
Philadelphia ---lbs
Elgin, Ill ---lbs
Chicago---lbs
New Orleans---lbs
Pacific coast ---lbs
Boston---lbs
Cleveland, O. ---lbs

d Name other cities, with amounts shipped........................

....

....

19. Give the number of persons patronizing the creamery including the skim stations connected therewith from May 1, 1896, to May 1, 1897, or part of year operated?..........

20. Estimate the number of cows comprising the herd of the average patron of your creamery?..................
(Please take extra pains to get information so as to answer this question.)

21. If there are any new creameries or skim stations in your county, opened since November 1, 1896, state where they are located and give proprietor or manager:
Name......................P. O. address........................
Name......................P. O. address........................
Name......................P. O. address........................

22. If there are any old creameries or skim stations reopened in the past year in your county, give location and by whom operated:
Name......................P. O. address........................
Name......................P. O. address........................

23. Give the names of any creameries or skim stations in your county having burned since November 1, 1896, giving causes when known?...
....
Has the creamery or creameries been rebuilt?..............

24. Give the amount and value of all coal used in your creamery during the year ending May 1, 1897, or part of year operated?
Number tons?........................Value? $ ....

a State what per cent or amount of this coal was domestic (mined in Iowa):
Number of tons or per cent?.........Value? $...................

b State what per cent or amount was foreign (mined outside of Iowa)?...

c If quality, cost at mine or freight rates cause preference for foreign coal, state which; also other reasons, if any?..................
....

W. K. Boardman, State Dairy Commissioner:

DEAR SIR—Herewith find a report of the .... creamery for the year ending May 1, 1897. Respectfully,

....
(Prop., Sec. or M'gr.)

The office record number of this creamery for 1896, is ....
The office record number of this skim station for 1896, is ....

NOTE—Kindly give this your immediate attention. Stamped and addressed envelope enclosed.

The hearty thanks of this department is extended to all those who have answered all questions and promptly returned the report to this office. Also to those who made an effort and thereby made a partial report, but on account of unavoidable reasons could not entirely fill it out. It is with regret, however, that we are obliged to admit, notwithstanding the repeated and urgent requests made for the report, many did not respond, or if so, did respond in a manner such as to be of little practical use. To these, we have no comment to offer, other than they should be willing to assist in anything reasonable that will promote the interests with which they are connected. Under the provisions of the new code, which became effective October 1, 1897, all creameries, cheese factories and butter packing establishments are obliged to make reports annually to the dairy commissioner, upon blanks furnished by him. This provision should be made applicable to all delinquents to the end that a complete compilation can be had of all creameries and factories of the state, thereby avoiding the necessity of making estimates for those not reporting.

The thanks of the department are extended also to county auditors and United States postmasters who have rendered assistance by furnishing information that we were unable to obtain directly from the managers of the creameries and cheese factories. The promptness and unanimity which these requests were complied with, is worthy of special mention, and in making up a list of all Iowa creameries and cheese factories without their assistance and on account of the negligence of those interested, it would have been far from complete. Railway representatives and manufacturers' agents for creamery supplies have also assisted in perfecting the list.

In order to analyze the past and present conditions of the creamery interests of Iowa, numerous tables have been compiled and arranged by counties. These tables are numbered, and in making a summary, will be referred to according to their respective numbers. Similar tables were printed in the tenth annual report of this department and in some cases reference will be made to them.

SYSTEMS OF OPERATION—NEW CREAMERIES.

From the following table (No. 2) the following information is derived: But three counties in the state are without creameries in operation, as reported up to November 1, 1897. These counties are Appanoose, Des Moines and Fremont. Monroe county and Woodbury have joined the list since 1896. Monroe now has one creamery, and Woodbury six, the largest increase of any one county in the state. There were 891 creameries and skim stations reported in operation November 1, 1897. This is a net increase of eighty-one creameries over those of 1896. Of the 891 creameries and skim stations in operation, 504 are given as individual creameries, which is, that they are operated by proprietary management, either individual, firm or company. Three hundred and forty-nine are owned and operated as co-operative creameries—that is, by the patrons themselves through a board of directors. There are thirty-seven creameries operated by stock companies, part of which are similar to a proprietary management and others upon lines of co-operation. One creamery is not included in these allotments, it being the property of the state of Iowa, and located at Ames. As compared with 1896, we find that there are eighty more individual creameries and skim stations, and. forty-five more co-operative in operation, and a decrease of forty-four in the stock company creameries. This indicates that the stock company system of operating creameries is fast disappearing, and that the proprietary and co-operative systems are to prevail. From a comparison of the increase it will be seen that the individual or proprietary system has made as much again the increase of the co-operative creamery system; still these figures may be misleading unless more fully explained. In the net increase of eighty-one creameries and skim stations, forty-eight are creameries and thirty-three skim stations, and a large majority of these skim stations are connected with proprietary creameries, thus swelling the number of individual creameries and skim stations. In many cases a well managed skim station does as much business and is of as much value to a community as a fully operated creamery.

From the same table we find the 891 creameries and skim stations divided as follows: Seven hundred and seventy are separator creameries, sixty-eight gathered cream and fifty-two combined separator and gathered cream. From Table No. 10 of the tenth annual report, the division was as follows: Six hundred and forty-one separator creameries, ninety-five gathered cream and seventy-four combined. We now find by comparison that there has been a gain in the separator system of 130 creameries, which is made up from the new creameries commencing operation since the last annual report, and change of system of operation in the other two classes, as there has been a decrease in the number of gathered cream class of twenty-seven, and of twenty-two of the combined separator and gathered cream. Those, added to the eighty-one new creameries, make up the 130 increase in the separator system. Taking the sixty-eight gathered cream plants from the total number of creameries and skim stations in operation, we find 820 receiving milk. Of this number 698 use the test system to arrive at the value of butter fat in each patron's milk, and 122 still adhere to the out-of-date, unprogressive plan of paying for the milk according to its weight, regardless of the variation in quantity of butter fat existing in milk delivered at different times and from different herds. The receipt of milk according to weight does not encourage honest or profitable methods. The change taking place is encouraging. There has been an increase of 120 creameries receiving milk over that of 1896, and an increase of 125 using the test plan for settlement, and a decrease of five making settlement according to weight. This shows a gain for the test plan, from its adoption by a number equal to all of the new creameries, together with five that formerly received milk by the hundred weight.

It may not be out of place to mention the fact that creamery failures throughout the state are less and less in number each year and I am of the opinion that the adoption of the test system has had much to do in bringing about the better condition of affairs, by placing the operator in a position in which he can know exactly what he is doing, and at the same time encourage the patrons to improve their stock, as by so doing they reap the benefits to be derived from the production of a better quality of milk. Now that the test plan can practically be declared the general system for receiving milk, the greatest care should be exercised in preventing abuse and deception in its operation. In previous reports reference has been made to this subject, and the desirability of state inspection has been advanced. The necessity of this is each year made more apparent. The reading of the test either too high or too low should be made so dangerous that no person or persons in any way connected with the management of a creamery would subject themselves to exposure and prosecution. The evil does not stop with the creamery itself, but extends to neighboring creameries, where ofttimes the honest and correct operator of the tester is made to suffer through the appearance that his creamery is not giving as large average tests in one case, or is not paying as much per pound for butter fat in another, as the creamery where false manipulation is being practiced.

The importance of correct tests is so great that the state should be divided into districts, and competent persons, after passing a thorough examination, at the experimental station at Ames, should be appointed by the dairy commissioner to give instructions in the science of testing and also to inspect the apparatus used and the manner of testing, together with many of the other duties necessary and of importance to the creamery system.

In Table No. 2, under the head of "number of creameries and skim stations burned, rebuilt, etc., during the year ending May 1, 1897," the following is taken as a summary: There was reported 100 new creameries built in fifty-five counties, and thirty-seven new skim stations in twenty counties. This is by far the largest number newly built in any one year of which there is a record. We have reported eighteen creameries as being burned during the year, three of which were rebuilt. Of the creameries that have been closed for some time, forty-three are reported as reopened, and fifty-five that were in operation last year are now closed. We also have reports of sixteen skim stations being closed, and five others changed from skim stations to creamery plants. There were eight creameries reported to have been changed to skim stations.

TABLE No. 2.

Number creameries and skim stations in each county, how operated, number built, burned, etc.

COUNTIES.	NUMBER CREAMERIES AND SKIM STATIONS, SHOWING NUMBER INDIVIDUAL, CO-OPERATIVE & STOCK COMPANIES.					NUMBER OPERATING AS SEPARAT'R, GATHERED CREAM, OR BOTH.				NUMBER RECEIVING MILK BY TEST OR CWT.			N'MB'R CREAM'RIES AND SKIM STATIONS BUILT, BURNED AND REBUILT, RE-OPENED OR CLOSED DURING THE YEAR ENDING NOVEMBER 1, 1897.						
	Total number of creameries and skim stations.	Number reported.	Individual.	Co-operative.	Stock company.	Number creameries reported.	As separator.	Gathered cream.	As combined separator and gathered cream.	Number creameries reported.	By test.	By cwt	New creameries, 1897.	New skim stations, 1897.	Total new creameries and skim stations, 1897.	Burned.	Rebuilt.	Old creameries re-opened.	Creameries closed.
The state	891	890	504	349	37	891	771	68	52	820	698	122	100	37	137	18	3	43	55
Adair	9	9	9	...	..	9	9	..	.....	9	5	4	1	3	4	..	..	...	2
Adams	8	8	7	1	..	8	8	..	....	8	8	...	1	....	1	..	..	2	..
Allamakee	9	9	2	7	..	9	4	4	1	5	5	...	1	....	1	..	..	....	4
Appanoose	.....	...	..	...	..	...	...	..	.....	...	...	...	...	....	.....	..	..	....	..
Audubon	6	6	1	5	..	6	6	..	.....	6	6	...	1	1	2	..	..	....	1
Benton	12	12	10	2	..	12	8	1	3	11	9	2	3	....	3	1	1	....	1
Black Hawk	19	19	4	15	..	19	19	..	.....	19	17	2	....	....	.....	1	..	..	1
Boone	7	7	6	1	..	7	6	..	1	7	7	...	3	1	4	..	..	..	..
Bremer	24	24	3	21	..	24	24	..	.....	24	12	12	2	....	2	1	..	....	4
Buchanan	15	15	7	8	..	15	15	..	.....	15	15	..	....	....	.....	..	..	....	2
Buena Vista	10	10	7	3	..	10	10	..	.....	10	8	2	1	....	1	..	..	....	..
Butler	21	21	8	11	2	21	19	..	2	21	11	10	3	....	3	1	1	....	..
Calhoun	7	7	4	3	..	7	7	..	.....	7	6	1	....	....	.....	..	..	1	..
Carroll	12	12	10	2	..	12	10	..	2	12	6	6	2	2	4	..	..	....	..
Cass	7	7	7	...	..	7	7	..	.....	7	7	...	1	6	7	..	..	....	..
Cedar	11	11	9	1	1	11	3	3	5	8	4	4	....	....	.....	..	..	3	..
Cerro Gordo	11	11	7	4	..	11	9	..	2	11	11	...	2	....	2	..	..	..	..
Cherokee	7	7	6	1	..	7	7	..	.....	7	5	2	1	....	1	..	..	....	..
Chickasaw	20	20	5	15	..	20	19	1	.....	19	19	...	1	....	1	..	..	....	..
Clarke	4	4	4	..	..	4	4	..	.....	4	4	...	...	....	.....	..	..	....	..
Clay	9	9	7	1	1	9	9	..	.....	9	9	...	1	....	1	..	..	1	..
Clayton	21	21	10	10	1	21	21	..	.....	21	21	...	....	....	.....	..	..	....	..
Clinton	15	15	13	2	..	15	15	..	.....	15	13	2	1	1	2	2	..	....	..
Crawford	8	8	7	1	..	8	8	..	.....	8	6	2	1	1	2	..		....	2
Dallas	6	6	4	2	..	6	6	..	.....	6	6	...	....	....	.....	..	..	..	..
Davis	3	3	3	...	..	3	2	..	1	3	3	...	..	....	.....	..	..	....	..
Decatur	2	2	1	...	1	2	2	..	.....	2	2	...	..	....	.....	..	..	2	..
Delaware	27	27	12	14	1	27	27	..	.....	27	24	3	2	....	2	4	..	3	2
Des Moines	.....	...	...	...	..	....	...	..	.....	...	...	...	....	...	.....	..	..	....	..
Dickinson	3	3	3	...	..	3	3	..	.....	3	3	...	....	....	.....	..	..	..	..
Dubuque	26	26	9	17	..	26	25	..	1	26	14	12	....	....	.....	..	..	....	..
Emmet	4	4	1	3	..	4	4	..	.....	4	4	...	....	....	.....	..	..	....	..
Fayette	23	23	3	18	2	23	21	..	2	23	21	2	1	....	1	2	..	...	1
Floyd	6	6	4	2	..	6	3	1	2	5	5	...	....	....	.....	..	..	....	..
Franklin	11	11	6	5	..	11	9	1	1	10	8	2	1	....	1	..	..	1	..
Fremont	.....	...	...	...	..	....	...	..	.....	....	...	...	....	...	.....	..	..	....	..
Greene	9	9	7	2	..	9	9	..	....	9	8	1	2	3	5	1	1	....	..
Grundy	18	18	14	4	..	18	17	..	1	18	17	1	....	....	.....	..	..	....	1
Guthrie	11	11	9	2	..	11	9	2	.....	9	9	...	1	4	5	..	..	1	..
Hamilton	10	10	6	3	1	10	10	..	.....	10	10	...	5	....	5	..	..	....	..
Hancock	8	8	1	7	..	8	6	2	.....	6	6	...	5	....	5	..	..	...	2
Hardin	12	12	6	6	..	12	10	2	.....	10	8	2	3	....	3	..	..	1	..
Harrison	7	7	3	4	..	7	7	..	.....	7	7	...	4	1	5	..	..	....	..
Henry	3	3	2	1	..	3	3	..	.....	3	3	...	1	....	1	..	..	....	..
Howard	7	7	2	5	..	7	5	1	1	6	6	...	1	....	1	..	..	....	1
Humboldt	10	10	3	7	..	10	10	..	.....	10	10	...	3	1	4	..	..	....	1
Ida	5	5	5	...	..	5	5	..	.....	5	1	4	....	....	.....	..	..	....	..
Iowa	6	6	6	...	..	6	...	4	2	2	2	..	....	....	.....	..	..	2	1
Jackson	18	18	13	5	..	18	10	3	5	15	14	1	1	1	2	..	..	1	..
Jasper	11	11	9	1	1	11	10	1	.....	10	10	...	....	....	.....	..	..	1	..

TABLE No. 2—CONTINUED.

COUNTIES.	NUMBER CREAMERIES AND SKIM STATIONS, SHOWING NUMBER INDIVIDUAL, CO-OPERATIVE & STOCK COMPANIES.					NUMBER OPERATING AS SEPARAT'R, GATHERED CREAM, OR BOTH.				NUMBER RECEIVING MILK BY TEST OR CWT.			N'MB'R CREAM'RIES AND SKIM STATIONS BUILT, BURNED AND REBUILT, RE-OPENED OR CLOSED, DURING THE YEAR ENDING NOVEMBER 1, 1897.						
	Total number of creameries and skim stations.	Number reported.	Individual.	Co-operative.	Stock company.	Number creameries reported.	As separator.	Gathered cream.	As combined separator and gathered cream.	Number creameries reported.	By test.	By cwt.	New creameries, 1897.	New skim stations, 1897.	Total new creameries and skim stations, 1897.	Burned.	Rebuilt.	Old creameries re-opened.	Creameries closed.
Jefferson	10	10	8	2	..	10	9	..	1	10	10	...	2	1	3	.	..	....	..
Johnson	9	9	8	1	..	9	6	3	...	6	6	..	1	1	2	..	..	....	..
Jones	26	26	20	6	..	26	26	..	. ..	26	25	1	....	....	......	..	..	.. .	3
Keokuk	5	5	4	...	1	5	5	..	......	5	4	1	...	....	......	1	..	1	..
Kossuth	20	20	...	20	..	20	20	..	......	29	20	...	1	....	1	..	..	....	.
Lee	2	2	2	...	..	2	1	1	.....	1	1	...	1	....	1	..	..	....	1
Linn	28	28	18	3	7	28	27	1	.....	27	17	10	...	1	1	..	..	....	..
Louisa	3	3	3	..	..	3	1	2	......	1	1	...	....	...	.....	..	..	....	..
Lucas	1	1	. .	1	.	1	1	..	......	1	1	...	....	....	......	..	..	....	..
Lyon	3	3	1	1	1	3	3	..	......	3	1	2	....	....	......	..	..	....	..
Madison	4	4	3	1	..	4	4	..	......	4	4	...	1	....	1	..	..	2	1
Mahaska	1	1	...	...	1	1	...	1	......	....	....	...	1	....	1	..	..	....	2
Marion	5	5	4	1	..	5	4	1	......	4	4	...	....	....	......	..	..	....	..
Marshall	7	7	2	5	..	7	4	2	1	5	5	...	....	....	......	..	..	....	..
Mills	3	3	3	...	..	3	1	2	.....	1	1	...	....	....	......	..	..	....	..
Mitchell	8	8	...	8	..	8	...	5	3	3	3	...	....	....	......	1	..	....	1
Monona	2	2	1	1	..	2	2	..	......	2	1	1	1	...	1	..	..	....	..
Monroe	1	1	1	...	..	1	1	..	......	1	1	...	1	....	1	..	.	. ..	..
Montgomery	2	2	2	...	.	2	2	..	......	2	2	..	....	...	......	..	..	....	..
Muscatine	6	6	6	...	..	6	. .	1	5	5	2	3		....	......	..	..	...	..
O'Brien	4	4	3	...	1	4	4	..	......	4	...	4	....	....	......	..	..	2	..
Osceola	4	4	3	1	..	4	4	..	...	4	4	...	1	....	1	..	..	1	..
Page	7	7	4	2	1	7	6	..	1	7	6	1	4	....	4	..	..	....	1
Palo Alto	16	16	2	13	1	16	16	..	......	16	16	...	1	..	1	..	..	....	2
Plymouth	10	10	...	10	..	10	10	..	.....	10	9	1	3	....	3	..	..	...	.
Pocahontas	9	9	8	1	..	9	9	..	....	9	7	2	4	....	4	..	..	1	..
Polk	6	6	2	3	1	6	6	..	.....	6	5	1	1	....	1	..	..	....	1
Pottawattamie	5	5	2	2	1	5	4	1	.....	4	3	1	....	....	......	..	..	...	..
Poweshiek	6	6	6	...	..	6	5	1	.....	5	5	..	....	....	......	..	..	2	2
Ringgold	4	4	3	1	..	4	3	1	....	3	2	1	2	....	2	..	..	....	..
Sac	14	14	11	2	1	14	14	..	.....	14	10	4	1	....	1	..	..	1	..
Scott	4	4	4	...	..	4	3	1	. ....	3	3	...	1	....	1	..	..	.....	..
Shelby	6	6	4	2	..	6	6	..	......	6	4	2	1	1	2	..	..	....	..
Sioux	9	9	6	2	1	9	9	..	....	9	3	6	....	....	......	..	..	....	..
Story	16	*15	6	8	1	16	16	..	.....	16	16	...	3	....	3	..	..	1	1
Tama	8	8	6	1	1	8	2	4	2	4	4	...	1	....	1	1	..	3	1
Taylor	8	8	6	1	1	8	7	1	.....	7	7	. .	....	...	......	..	..	2	..
Union	13	13	9	1	3	13	13	..	.....	13	13	...	....	3	3	..	..	....	..
Van Buren	3	3	2	...	1	3	1	1	1	2	2	...	....	2	2	..	..	....	1
Wapello	5	5	5	...	..	5	5	..	......	5	5	...	....	...	......	..	..	1	1
Warren	4	4	4	...	..	4	4	..	.....	4	4	...	1	....	1	..	..	1	..
Washington	5	5	5	...	..	5	4	1	.....	4	4	...	....	....	....	..	..	...	..
Wayne	6	6	6	...	..	6	6	..	......	6	5	1	....	...	......	..	..	1	2
Webster	6	6	5	1	..	6	4	2	.....	4	4	...	.	....	......	..	..	....	..
Winnebago	12	12	...	12	..	12	11	..	1	12	12	...	3	2	5	..	..	....	2
Winneshiek	12	12	7	4	1	12	2	8	2	4	4	...	....	....	......	2	..	2	6
Woodbury	6	6	6	...	..	6	6	..	.....	6	3	3	4	....	4	..	..	2	..
Worth	10	10	2	8	..	10	7	2	1	8	8	...	1	....	1	..	..	....	..
Wright	9	9	6	2	1	9	7	..	2	9	9	...	3	1	4	..	..	1	1
Total	891	890	504	349	37	891	771	68	52	820	698	122	100	37	137	18	3	43	55

Sixteen skim stations closed.

Eight creameries changed to skim stations.

Five skim stations changed to creameries.

*Creamery at experiment station, Ames, not classified under this heading, it being the property of the state.

VALUATION OF CREAMERIES—POUNDS MILK RECEIVED.

From Table No. 3 the following facts and extracts are derived: The 891 creameries and skim stations in the state are divided into 773 creameries and 118 skim stations. Of this number, 708 report the value of their plants to be $2,197,437, an average of $3,103 each. One hundred and seven skim stations report their value to be $142,800, or $1,335 each. Taking these figures as a basis, the 773 creameries and 118 skim stations have a total valuation of $2,556,149. By comparison of the estimates given in the tenth annual report, it will be seen that there is a shrinkage in the valuation of Iowa creameries of about $500,000, while at the same time there are eighty-one new creameries and skim stations. These figures show a decrease of about $900 in the average value of the creameries, and about $200 in the average value of the skim stations. This, no doubt, can be mainly accounted for by the fact that the cost of building and equipping a first-class creamery has been greatly reduced, by the ignoring of the creamery shark of the past and the adoption of business methods in their construction. The value of a plant must be the amount necessary to reproduce it, and by taking this as a standard many of the creameries that originally and unnecessarily cost $5,000 or $6,000, have been valued in the 1897 report to this office at a figure for which they could now be constructed. The experiences of the past in connection with creamery building should teach a lesson to those sections of the country now looking to dairy development. A mistake in this direction ofttimes requires years of labor and patience to regain confidence lost and renew the interest necessary to maintain a successful creamery.

From Table No. 3 we find of the creameries that were in operation during the year ending May 1. 1897, that of the number reporting 542 were in operation the entire year, 74 six months or more, and 27 less than six months, and the average time for the 643 creameries reporting was 10.2 months. It will be seen that about 80 per cent of the number of creameries reporting upon this subject were in operation the entire year. We further find from Table No. 3 that 407 creameries had 46,072 patrons, which is an average of 113 patrons to each creamery. The same number of creameries report 392,425 cows, which is an average of 964 cows to each creamery, and 8.5 cows to each patron. Taking these figures as a basis, there would be 87,349 creamery patrons and 745,173 cows for the 778 creameries. As compared with figures given upon this subject, based upon information in Table No. 10 of the tenth annual report, there is an increase of 9,049 patrons and 78,847 cows. This is but a slight increase in the number of patrons, and but 45 cows, per creamery. The increase in the number of cows can be accounted for by the herds of the increased number of patrons.

The additional number of cows contributing to the production of milk to be manufactured into butter at our creameries is made up from two classes of farmers. One, that has not been engaged in the dairy business heretofore, and the other that has manufactured butter on the farm. Thus the creamery system is fast decreasing the quantity of butter manufactured on the farm, and by modern improvements is increasing the quantity as well as the quality of butter throughout the sections that have been without creameries hitherto. As the number of cows has not materially increased in those sections of the state where the creamery has been established for some time, and as a general increase in production has taken place, this increase must be attributed to one or two things, or both. They are that the patron has been disposing of his unprofitable cow and replacing with a better one, or that he has learned better how to feed for the production of milk. There is no branch of the dairy industry to-day that is as important as the one here referred to, "The cow and how to feed her." The reduction in the cost of production is almost entirely in the hands of the patron. The cost of manufacturing may be slightly reduced in the future, through improved methods and consolidation of creameries and creamery territories, but a reduction in this direction, though representing in the aggregate much, can not in any way be compared with the amount that might be saved annually, through the improvement of dairy herds and feeding along scientific lines.

TABLE No. 3.

Creameries and skim stations—Number and value of plants—Months operated—Number of patrons and number of cows.

COUNTIES.	NUMBER, VALUE, AND TOTAL VALUE OF CREAMERIES AND SKIM STATIONS REPORTING.								NO. OPERATED ENTIRE YEAR—NO. LESS THAN A YEAR—AVERAGE NO. OF MONTHS OPERATED.					NO. PATRONS FURNISHING MILK AND CREAM—NO. COWS PRODUCING MILK AND CREAM DELIVERED TO CREAMERIES WITH AVERAGE NO. TO EACH CREAMERY AND PATRON.						
	Total No creameries and skim stations.	No creameries.	No. reporting.	Value of creameries reporting.	No. of skim stations.	No. reporting.	Value of skim stations reporting.	Total value of creameries and skim stations reporting.	No. reporting.	Twelve months.	Six months or more.	Less than six months	Av. No. of months operated.	No. of creameries.	No. reporting.	Total No. of patrons reporting.	Av. No. of patrons per creamery.	Av. No. of cows per patron.	Total No. of cows reported.	Av. No. of cows per creamery.
The state......	891	737	708	$ 2,197,437	118	107	$ 142, 00	$ 2,340,237	643	542	74	27	10.2	773	407	46,072	113	8.5	$392,425	964
Adair..........	9	2	2	13,500	7	7	20, 00	33,600	2	1	1	....	10.6	2	2	345	173	9	2,760	1,380
Adams	8	3	2	7,000	5	5	6,300	13,300	2	2	....	....	12.0	3	1	262	262	10	2,620	2,620
Allamakee..	9	9	9	29,077	....	....	....	29,077	10	9	1	...	11.5	9	4	680	170	6	4,830	1,005
Appanoose..................	...	....	....	....	....	....	....	....	....	....	....	....	......	....	....	....	....	....	....	......
Audubon................	6	5	5	16,300	1	1	1,200	17,500	5	4	1	..	11.6	5	3	330	110	6	2,100	700
Benton..	12	11	9	38,300	1	1	2,100	40,400	8	7	1	....	11.2	11	4	423	105	5	2,380	595
Black Hawk.............	19	19	17	57,000	....	....	....	57,000	17	16	1	...	11 8	19	12	1,185	98	10	12,782	1,065
Boone....................	7	6	5	15,700	1	1	1,500	17,200	5	2	2	1	8.2	6	....	....	....		....	......
Bremer..	24	24	24	72,310	....	..	....	72,310	23	23	....	....	12.0	24	16	981	62	12	12,392	774
Buchanan..............	15	14	14	46,500	1	1	200	46,700	13	13	....	....	12.0	14	4	548	137	11	6,294	1,574
Buena Vista....	10	8	8	27,500	2	2	200	29,500	7	6	1	....	11.0	8	2	440	220	5	2,438	1,219
Butler	21	20	19	55,200	1	1	2,000	57,200	17	12	3	2	10.7	20	9	1,136	126	9	11,031	1,225
Calhoun	7	7	5	11,500	....	....	.....	11,500	5	4	1	....	11.0	7	4	304	76	14	4,174	1,043
Carroll.................	12	10	10	31,000	2	2	1,800	32,800	9	9	....	....	12.0	10	6	755	126	6	4,580	763
Cass......................	7	1	1	10,000	6	6	7,800	17,800	....	....	....	....	..	1	....	....	....	....	....	......
Cedar.	11	7	4	14,500	4	4	5,900	20,400	6	4	2	....	10.4	7	4	794	198	7	5,259	1,314
Cerro Gordo...	11	11	8	25,000	....	....	....	25,000	11	11	....	....	12.0	11	4	337	84	7	2,568	642
Cherokee..	7	7	5	13,000	....	....	....	13,000	4	3	1	....	9.5	7	1	75	75	8	600	600
Chickasaw..	20	20	18	59,200	....	....	....	59,200	18	18	....	.. ..	12.0	20	13	1,426	109	8	12,241	941
Clarke...	4	2	1	3,000	2	....	....	3,000	1	1	..	....	12.0	2	1	86	86	10	860	860
Clay.....................	9	9	9	22,500	....	....	....	22,500	9	8	1		11.5	9	8	559	69	8	4,718	577
Clayton.	21	20	20	68,500	1	1	1,000	69,500	19	17	1	1	10.5	20	13	1,779	137	8	16,075	1,236
Clinton......	15	7	7	18,000	8	6	7,950	25,950	7	3	3	1	9.0	7	7	415	59	7	2,820	403
Crawford................	8	5	3	11,500	3	3	2 200	13,700	4	3	1	...	11 0	5	1	48	48	5	432	432
Dallas	6	6	6	18,000	...	....	....	18,000	5	4	1	....	10.5	6	3	300	100	10	3,000	1,000

Davis	3	3	3	8,000	....	....	....	8,000	3	3		....	12.0	3	....	....	....	....	....	....
Decatur	2	1	1	3,000	1	1	2,000	5,000	....	....	....	....	....	1	....	....	....	....	....	....
Delaware	27	24	21	61,350	3	1	1,000	62,350	21	18	2	1	8 2	24	11	555	55	15	8,842	758
Des Moines	..	....	....	....	....	....	....	....	....	....	....	....		....	....	....	....	....	....	....
Dickinson	3	3	3	9,500	....	....	....	9,500	3	2	1	....	10.0	3	3	380	126	7	2,365	788
Dubuque	26	26	25	68,300	....	....	....	68,300	25	20	3	2	7 5	26	18	1,092	60	11	12,660	708
Emmet	4	4	4	7.300	..	....	....	7,300	2	1	1	...	11.0	4	2	140	70	12	1,595	797
Fayette	23	21	19	67,000	2	2	1,000	68,000	18	18	....	..	12 0	21	12	1,564	180	10	15,670	1,305
Floyd	6	6	6	17,500	....	....	....	17,500	6	6	....	....	12.0	6	5	695	139	6	4,475	895
Franklin	11	10	10	29,300	1	1	1,500	30,800	10	8	2	....	9.3	10	9	1,110	123	9	10,258	1,139
Fremont		....	....	....	....	....	....	....	....	..	....	...		....	....	....	....	....	....	....
Greene	9	8	5	17,000	1	1	1,500	18,500	5	4	..	1	8.5	8	3	336	112	4	1,658	550
Grundy	18	17	17	47,700	1	1	1,000	48,700	8	8	....	...	12 0	17	11	1,027	93	10	10,062	915
Guthrie	11	5	5	16,000	6	4	4,800	20,800	4	4	....	....	12 0	5	2	520	260	5	2,830	1,415
Hamilton	10	9	8	28,600	1	1	1,500	30,100	6	4	1	1	7 3	9	4	544	136	10	5,648	1,412
Hancock	8	8	6	15,000	....	....	....	15,000	2	2	....	.	12.0	8	....	....	....	....	....	....
Hardin	12	12	11	32,350	....	....	....	32,350	10	6	3	1	8 0	12	8	1,099	138	7	8,003	1,001
Harrison	7	6	5	16,500	1	1	400	16,900	2	1	1	..	9.5	6	2	164	82	6	868	434
Henry	3	3	3	7,200	....	....	....	7.200	2	1	1	...	11.0	3	3	300	100	4	1,320	440
Howard	7	7	7	20,400	.	....	....	20,400	6	4	2	....	9.6	7	4	1,048	262	7	7,578	1,894
Humboldt	10	9	7	22,800	1	1	1,700	24,500	6	6	..		12 0	9	4	305	76	11	3,420	855
Ida	5	5	4	18,500	....	....	....	18,500	4	2	1	1	8.6	5	3	450	150	8	3,230	1,076
Iowa	6	6	5	23,000	....	....	....	23,000	4	4	...	....	12.0	6	1	300	300	7	2,100	2,100
Jackson	18	18	12	35,500	5	5	5.350	40,850	11	7	3	1	10 7	13	7	511	73	8	4,176	596
Jasper	11	9	8	22,500	2	2	2,000	24,500	8	6	1	1	7.6	9	4	550	185	5	2,900	725
Jefferson	10	8	8	24,500	2	2	2,700	27,200	6	6		....	12.0	8	5	696	139	6	4,166	833
Johnson	9	7	7	12,800	2	2	1,200	14.000	4	3	1	..	10.0	7	3	145	48	9	1,145	348
Jones	26	17	17	46,700	9	9	10,300	57.000	17	15	2	..	9.0	17	14	784	56	11	9,332	718
Keokuk	5	4	4	14,000	1	1	1,500	15.500	4	3	1	....	10 5	4	3	840	118	6	1,830	610
Kossuth	20	20	20	58,900	....	....	....	58,900	18	16	1	1	9 0	20	16	1,358	79	10	14,155	883
Lee	2	2	2	4,500	....	....	....	4,500	2	1	1	.	8.0	2	1	21	21	11	231	231
Linn	28	24	21	53,000	4	4	5,700	58,700	21	21	...	...	12 0	24	12	853	71	8	7,564	630
Louisa	3	3	3	1,600	....	....	....	1,600	2	2	....	....	12.0	3	....	....	....	....	....	....
Lucas	1	1	1	4,000	....	....	....	4,000	1	1	...	...	12.0	1	1	180	180	12	2,160	2,160
Lyon	3	3	3	6,500	....	....	....	6,500	3	1	2	....	10.0	3	2	210	105	5	1,160	580
Madison	4	3	3	5,000	1	1	700	5,700	3	3	....	..	12.0	3	1	100	100	9	900	900
Mahaska	1	1	1	10,000	....	....	....	10.000	1	1	....	....	12.0	1	1	400	400	6	2,400	2,400
Marion	5	5	2	23,800	...	....	....	23,800	4	1	....	3	5.7	5	....	....	....	....	....	...
Marshall	7	7	7	20,000	...	....	....	20,000	6	6	....	..	12.0	7	6	1,008	167	7	7,258	1,208
Mills	3	3	3	5,700	....	....	....	5,700	3	2	1	....	11.0	3	2	900	450	4	3 900	1,950
Mitchell	8	8	8	13,800	....	....	....	13,800	8	8	...	..	12.0	8	6	1,642	274	9	11,247	1,874
Monona	2	2	2	5,500	....	....	....	5,500	1	1	....	....	12.0	2	1	120	120	6	720	720
Monroe	1	1	1	2,500	....	....	....	2,500	1	1	....	....	12.0	1	....	....	....	....	....	....
Montgomery	2	1	1	2,000	1	1	....	2,000	1	1	...	....	12.0	1	....	....	....	....	....	....
Muscatine	6	4	4	11.000	2	2	500	11,500	4	4	....	....	12 0	4	3	805	269	4	3,925	1,308
O'Brien	4	4	4	13,100	....	....	....	13,100	4	2	2	..	11.0	4	2	162	81	10	1,744	872
Osceola	4	4	2	2,500	....	....	....	2,500	1	1	....	....	12.0	4	....	....	....	....	....	....
Page	7	7	5	16,000	....	....	....	16,000	1	1	....	....	12.0	7	1	80	80	5	400	400
Palo Alto	16	16	16	49,800	....	....	....	49,800	15	15	...	..	12.0	16	7	417	59	10	4,461	637
Plymouth	10	10	10	36,200	....	....	....	36,200	6	5	1	....	9.0	10	5	507	102	8	3,588	71

TABLE No. 3—CONTINUED.

COUNTIES.	NUMBER VALUE AND TOTAL VALUE OF CREAMERIES AND SKIM STATIONS REPORTING.								NO. OPERATED ENTIRE YEAR—NO. LESS THAN A YEAR—AVERAGE NO. OF MONTHS OPERATED.					NO. PATRONS FURNISHING MILK AND CREAM—NO. COWS PRODUCING MILK AND CREAM DELIVERED TO CREAMERIES WITH AVERAGE NO. TO EACH CREAMERY AND PATRON.						
	Total No. creameries and skim stations.	No. creameries.	No. reporting.	Value of creameries reporting.	No. of skim stations.	No. reporting.	Value of skim stations reportinr.	Total value of creameries and skim stations reporting.	No. reporting.	Twelve months.	Six months or more.	Less than six months	Av. No. of months operated.	No. of creameries.	No. reporting.	Total No. of patrons reporting.	Av. No. of patrons per creamery.	Av. No. of cows per patron.	Total No. of cows reported.	Av. No. of cows per creamery.
Pocahontas	9	9	8	56,300	....	....	....	56,300	6	6	....	.	12 0	9	4	490	125	13	6,470	1,617
Polk	6	6	5	16,500	....	....	....	16,500	5	5	....	....	12.0	6	3	180	60	9	1,738	579
Pottawattamie	5	5	5	16,800	....	....	....	16,800	4	4	....	....	12 0	5	4	1,122	281	6	6,850	1,712
Poweshiek	6	5	4	5,000	1	1	1,500	6,500	1	.	..	1	4.0	5	....	....	....	....	....	....
Ringgold	4	3	3	5,400	1	1	3,500	8,900	4	3	1	1	8 2	3	....	....	....	....	....	....
Sac	14	14	14	40,000	....	....	....	40,000	13	12	1	....	9.5	14	7	400	57	10	4,364	623
Scott	4	4	3	9,500	....	....	....	9,500	3	1	1	1	8 0	4	1	25	25	10	250	250
Shelby	6	6	3	9,000	1	1	1,600	10,600	2	2	....	..	12 0	5	3	387	129	8	2,449	816
Sioux	9	8	8	23,200	1	....	....	23,200	8	6	2	....	9.5	8	6	470	78	9	3,877	646
Story	16	16	15	61,200	....	....	....	61,200	13	11	2	....	9.7	16	8	951	119	9	9,133	1,141
Tama	8	8	8	23,100	....	....	....	23,100	7	3	2	2	9.0	8	3	590	196	6	3,490	1,163
Taylor	8	6	6	19,600	2	....	....	19,600	6	5	1		11.5	6	4	320	80	16	5,221	1,305
Union	13	5	4	15,000	8	8	9,700	24,700	9	8	1	..	11 5	5	3	460	153	7	2,875	958
Van Buren	3	2	1	4,050	1	1	1,200	5,250	2	1	.	1	7.0	2	1	45	45	4	180	180
Wapello	5	5	5	10,700	....	....	....	10,700	3	1	1	1	11.0	5	1	150	150	15	2,250	2,250
Warren	4	4	4	7,500	....	....	....	7,500	1	.	1	....	6.5	4	1	100	100	5	500	500
Washington	5	5	5	25,000	....	..	....	25,000	4	3	1	..	11.5	5	3	199	66	30	5,988	1,996
Wayne	6	3	3	13,000	3	3	6,000	19,000	3	2	1	....	10.5	3	2	630	315	4	2,985	1,492
Webster	6	6	6	18,500	....	....	....	18,500	5	3	2	....	10 4	6	3	445	148	6	3,020	1,006
Winnebago	12	6	6	18,500	6	6	8,500	27,000	5	5	....	....	12.0	6	2	250	125	8	2,280	1,140
Winneshiek	12	12	12	27,800	....	....	....	27,800	11	10	1	....	9 5	12	7	932	133	9	8,860	1,265
Woodbury	6	6	4	14,300	....	.	....	14,300	2	2	....	....	12.0	6	....	....	....	....	....	....
Worth	10	9	9	18,700	1	1	1,200	19,900	10		1	....	10.0	9	9	1,236	137	8	9,223	1,024
Wright	9	8	8	23,000	1	1	1,200	23,200	6	5	....	1	8.0	8	2	170	85	9	1,510	755
Total	891	778	708	$ 2,197,437	118	107	$ 142,800	$ 2,340,237	648	543	74	27	10.2	778	407	46,072	10,671	700	398,435	84,158

MILK AND THE BUTTER PRODUCTION THEREFROM.

From Table No. 4 the following information is ascertained: There are 705 creameries receiving milk. Of this number 447 furnish reports that they received during the year ending May 1, 1897, 1,091,897,875 pounds of milk, which produced 49,130,266 pounds of separator butter. This would be an average of 2,442,225 pounds of milk, and 109,911 pounds of separator butter per creamery, or, an amount equal to 1,722,721,125 pounds of milk and 77,487,255 pounds of separator butter for the 705 separator creameries. The receipts of milk by skim stations are credited to the creameries of which they are auxiliaries. These figures indicate that it required an average of 22.2 pounds of milk to produce one pound of butter. This is one-half pound less than a similar estimate given in the last annual report. Five hundred and five creameries report the pounds of butter manufactured. Four hundred and forty-seven of this number are separator or combined separator and gathered cream plants, leaving fifty-eight as distinct gathered cream plants. This number reports manufacturing 7,920,289 pounds of gathered cream butter, which would be 136,557 pounds per creamery, or 9,285,876 pounds for the sixty-eight gathered cream plants. The total number of pounds of all grades of butter manufactured by the 505 creameries was 58,143,363 pounds, an average of 115,135 pounds for each creamery, and equal to 88,999,355 pounds for the 773 creameries. From previous calculations the amount of separator is given as 77,487,255 pounds, and of gathered cream, 9,288,876 pounds. This, taken from the total amount, would leave 2,223,124 pounds for the amount of combined separator and gathered cream butter manufactured. The disposition of this quantity of butter may be of interest. The 505 creameries reporting upon their make of butter also report furnishing their patrons with 2,891,783 pounds; shipping to Iowa markets 2,612,842 pounds, and to points outside of the state 52,638,738 pounds. Taking these figures as a basis, the 773 creameries furnish their patrons 4,426,198 pounds, furnished Iowa markets with 3,999,502 pounds, and shipped to points outside of the state 80,569,017 pounds. It will be seen from these figures that about 90 per cent of the creamery butter manufactured is shipped to points outside of the state, and less than 10 per cent is consumed in Iowa.

TABLE No. 4.

Creameries—Pounds of milk received; kinds and amount of butter manufactured, and disposition of same.

COUNTIES.	NUMBER OF CREAMERIES RECEIVING AND TOTAL POUNDS OF MILK REC. FROM MAY 1, 1896, TO MAY 1, 1897.			NUMBER OF CREAMERIES MANUFACTURING BUTTER. TOTAL POUNDS AND VALUE OF ALL BUTTER MANUFACTURED FROM MAY 1, 1896, TO MAY 1, 1897, GIVING POUNDS OF SEPARATOR, GATHERED CREAM AND COMBINED SEPARATOR AND GATHERED CREAM.						TOTAL POUNDS OF BUTTER FURNISHED PATRONS, MARKETED IN IOWA AND SHIPPED TO POINTS OUTSIDE OF THE STATE.			
	No. rec. milk.	No. reported.	NO. POUNDS OF MILK RECEIVED.	Number crm'ies mnfg.	No. reported.	TOT'L LBS SEPARATOR.	TOTAL POUNDS GATH'RD CREAM.	Tot. lbs. com. sep and gath'rd cream.	TOTAL POUNDS MNFD.	Number reported.	NO. LBS. FURNISHED PATR'NS	NO LBS. MARKETED IN IOWA	No. lbs. shipped to points outside of state.
The state	705	447	1,091,897,875	778	505	49,130,266	7,920,289	1,092,808	58,143,363	505	2,891,783	2,612,842	52,638,738
Adair	2	2	6,639,435	2	2	277,670	....	....	277,670	2	15,000	26,221	236,449
Adams	3	1	3,563,815	3	1	158,716	....	....	158,716	1	15,871	....	142,845
Allamakee	5	3	9,375,612	9	6	410,374	419.122	8,009	837.505	6	105,872	12,468	719,665
Appanoose	......	......	....	......	......	....	....	....	....	......	......	....	....
Audubon	5	5	12,565,773	5	5	539,790	....	....	539,790	5	9,290	1,838	528.662
Benton	10	5	10,788,318	11	5	1,228,826	31,073	35,000	1,294,899	5	7,088	311,706	975,603
Black Hawk	19	14	43,971,090	19	14	1,985.470	....	....	1,985,470	14	198,090	139,936	1,647,444
Boone	6	3	7,745,370	6	3	332,723	....	....	332,723	3	......	....	332,723
Bremer	24	19	54,609,404	24	19	2,852,715	....	....	2,852,715	19	167,118	36,426	2,649,171
Buchanan	14	8	41,995,308	14	8	1,748,222	....	....	1,748,222	8	49,896	42,211	1,656,115
Buena Vista	8	4	8,390,601	8	4	453,897	....	....	453,897	4	10,200	......	448,197
Butler	20	15	87,698,859	20	15	1.856,564	40,770	....	1,897,334	15	79,995	30,988	1,786,351
Calhoun	7	5	4,716,671	7	5	270,741	....	....	270,741	5	2,000	4,016	264.725
Carroll	10	7	9,387,392	10	7	384,863	....	....	384,863	7	10,700	....	374,163
Cass	1	......	....	1	......	....	....	....	....	......	......	......	....
Cedar	4	3	9,705,754	7	3	177,620	31,000	234,660	443,280	3	18,420	7,400	417,460
Cerro Gordo	11	4	6,314,884	11	5	268,730	76,067	.....	344,797	5	18,299	4,432	322,066
Cherokee	7	1	270,000	7	1	10,800	....	....	10,800	1	....	....	10,800
Chickasaw	19	14	45,647,455	20	15	1,896,875	85,099	85,049	2,067,023	15	126,277	52,008	1,888,738
Clarke	2	1	1,500.000	2	1	69,000	....	....	69.000	1	6.900	55,200	6,900
Clay	9	6	9,092,951	9	6	460,311	....	....	460,311	6	20,783	2,152	437,376
Clayton	20	16	52,266,791	20	18	2,260,889	230,523	73,180	2,564,592	18	143,893	46.529	2,374,170
Clinton	7	6	7,256,432	7	6	298,345	....	....	298,345	6	1,500	87,000	209,845
Crawford	5	3	3,806,166	5	3	154,756	....	....	154,756	3	15,491	311	138.954
Dallas	6	3	4,732,648	6	4	193,118	96,000	....	289,118	4	2,753	48,705	237,660
Davis	3	2	1,584,352	3	2	67,335	....	....	67,335	2	....	4,625	62,710
Decatur	1	......	....	1	......	....	....	....	....	......	....	......	......
Delaware	24	18	50,375,513	24	18	2,212,220	....	....	2,212,220	18	114,070	24,019	2,074,131
Des Moines	......	......	....	......	......	....	....	....	....	......	......	....	......
Dickinson	3	1	3,580,000	3	1	162,000	....	....	162.000	1	16,200	....	145,800

Dubuque	26	20	48,476,856	26	20	1,559,643	....	....	1.559,643	20	144,827	57,075	1,357,741
Emmet	4	2	4.006,158	4	2	175,077	....	....	175,077	2	8,814	218	166,045
Fayette	21	16	67,151,357	21	16	2,991,844	5,412	....	2,997,256	16	359.318	179,955	2,457,983
Floyd	5	3	5,996,331	6	4	310,308	408,568	....	718.876	4	69,262	11,590	638.024
Franklin	9	6	8,501,602	10	7	351,635	215,800	9,180	576,615	7	116,559	14,865	445,191
Fremont	.....	.....	....	.....	.....	....	....	....	....	.....	....	....	....
Greene	8	3	5,584,385	8	3	211,398	....	....	211,398	3	3,761	....	207,637
Grundy	17	9	27,552,581	17	10	1,147,084	157,060	....	1,304,144	10	99,052	....	1,205,092
Guthrie	3	3	2,464,904	5	4	200,219	185,000	....	385,219	4	....	....	385,219
Hamilton	9	4	12,171,957	9	4	567,061	....	....	567.061	4	12,478	....	554,583
Hancock	6	1	255,682	8	2	29,940	90,864	....	120,804	2	2,819	....	117,985
Hardin	10	8	9,875,786	12	10	686,704	260,342	....	947,046	10	1,757	73,562	871,727
Harrison	6	1	751,369	6	1	33,123	....	....	33,123	1	2,963	15,207	14,953
Henry	8	3	831,175	8	3	51,427	....	....	51,427	3	2,871	1,368	47,188
Howard	6	3	7,212,168	7	4	690,157	200,000	....	890,157	4	4,406	....	885.751
Humboldt	9	6	12,735,447	9	6	474,724	....	74,055	548,779	6	11,706	3,356	533,717
Ida	5	2	4,786,367	5	2	194,043	....	....	194,043	2	3,000	2,000	189,043
Iowa	2	.....	....	6	2	....	255,000	....	255,000	2	6,500	125,000	123,500
Jackson	10	7	11,920,800	13	10	416,502	268,531	81,118	766,151	10	94,355	23,108	649,688
Jasper	8	6	11,864,291	9	7	509,312	141,970	....	651,282	7	2.394	22,174	626.214
Jefferson	8	7	32,334,284	8	7	544,364	15,015	....	559,379	7	12,825	49,400	497,154
Johnson	4	3	1,976,951	7	3	88,151	40,000	....	128,151	3	1,450	1,640	125.061
Jones	17	14	63,668,279	17	14	2,706,120	....	....	2,706,120	14	85,033	118,524	2,502.563
Keokuk	4	2	5,289,518	4	3	226,211	....	....	226,211	3	....	27.440	198.771
Kossuth	20	15	38,603,369	20	15	1,910,437	295	....	1,910,732	15	118,918	10,444	1,781,375
Lee	1	1	181,578	2	2	7,218	35,000	....	42,218	2	900	13,571	27,742
Linn	23	17	32,810,233	24	17	1,367,585	....	....	1,367,585	17	77,067	110,740	1,179.758
Louisa	1	.....	....	8	1	....	40,000	....	40,000	11	....	10.000	30,000
Lucas	1	1	2,654,402	1	1	117,518	....	....	117,518	1	4,888	25,110	87,515
Lyon	8	2	2,281,484	8	2	103,362	....	....	103,362	2	3,638	....	99,724
Madison	3	2	1,525,000	3	2	70,000	....	....	70,000	2	....	....	70,000
Mahaska	1	1	....	1	1	....	185,943	....	185,943	1	....	18,594	167,349
Marion	4	2	404,382	5	3	15,980	101,049	....	117,029	3	300	....	116.729
Marshall	5	3	5,083.166	7	6	203,234	591,846	....	795,080	6	77,434	39,674	677,972
Mills	1	1	1,448,000	3	3	51,186	145,000	....	196,186	3	2,047	81,280	112,859
Mitchell	3	1	425,464	8	6	17,016	1,041,231	239,690	1,297.937	6	35,709	27,803	1,234,425
Monona	2	1	547,500	2	1	24,637	....	....	24,637	1	....	....	24,637
Monroe	1	1	650,000	1	1	29,250	....	....	29,250	1	....	....	29,250
Montgomery	1	1	1,610,647	1	1	67,727	....	....	67,727	1	2,646	....	65,081
Muscatine	3	1	1,534,894	4	4	....	168,000	302,867	470,867	4	1,190	41,250	428.427
O'Brien	4	3	4,836,839	4	3	215,001	....	....	215,001	3	7.065	....	207,936
Osceola	4	.....	....	4	.....	....	....	....	....	.....	....	....	....
Page	7	1	988,524	7	1	36,612	....	....	36,612	1	200	812	35,600
Palo Alto	16	12	32,907,778	16	12	1,500,848	....	....	1,500,848	12	103,328	35,465	1.362,055
Plymouth	10	5	12,156.302	10	5	526,566	....	....	526,566	5	15,425	1,850	509,291
Pocahontas	9	4	8,059,581	9	4	344,626	....	....	344,626	4	2,715	....	341,911
Polk	6	4	7,467.741	6	4	312,250	....	....	312,250	4	10,817	301,433	....
Pottawattamie	4	3	3,917,868	5	4	176,808	400,000	....	576,808	4	7,249	12,829	556,725
Poweshiek	4	2	3,441,978	5	3	146,890	....	....	146,890	3	....	37,000	109,890
Ringgold	2	1	171,049	3	1	6,757	....	....	6,757	1	564	25	6,168

TABLE No. 4—CONTINUED.

COUNTIES.	NUMBER OF CREAMERIES RECEIVING AND TOTAL POUNDS OF MILK REC. FROM MAY 1, 1896, TO MAY 1. 1897.			NUMBER OF CREAMERIES MANUFACTURING BUTTER. TOTAL POUNDS AND VALUE OF ALL BUTTER MANUFACTURED FROM MAY 1, 1896, TO MAY 1, 1897, GIVING POUNDS OF SEPARATOR, GATHERED CREAM AND COMBINED SEPARATOR AND GATHERED CREAM.						TOTAL POUNDS OF BUTTER FURNISHED PATRONS, MARKETED IN IOWA AND SHIPPED TO POINTS OUTSIDE OF THE STATE.			
	No. rec. milk.	No. reported.	NO. POUNDS OF MILK RECEIVED.	Number cr'm'es mnfg.	No. reported.	TOT'L LBS SEPARATOR.	TOTAL POUNDS GATH'RD CREAM.	Tot. lbs. com. sep. and gath'rd cream.	TOTAL POUNDS MNFD.	Number reported.	NO. LBS. FURNISHED PATR'NS.	NO. LBS. MARKETED IN IOWA.	No lbs. shipped to points outside of state.
Sac	14	9	15,310,874	14	9	716,298	....	....	716,298	9	17,909	....	698,389
Scott	3	......	....	4	1	....	20,000	....	20,000	1	150	16,550	3,300
Shelby	5	2	4,446,676	5	2	191,364	....	....	191,364	2	3,421	....	187,943
Sioux	8	6	8.776,515	8	6	971,215	....	....	971,215	6	8,146	9,000	954.069
Story	16	9	23,012,144	16	9	961,298	....	....	961,298	9	51,163	65,141	844,994
Tama	4	2	521,487	8	5	22,581	109,314	....	131,895	5	1,916	1,000	128,979
Taylor	5	5	7,350,905	6	5	311,338	....	....	311,338	5	3,145	13,844	294,349
Union	5	3	7,674,437	5	3	392,219	....	....	392,219	3	28,501	1,000	362,718
Van Buren	1	1	42,086	2	1	1,921	....	....	1,921	1	....	....	1,921
Wapello	5	......	....	5	......	....	....	....	....	......	....	....	....
Warren	4	1	1,500,000	4	1	55,000	....	....	55,000	1	5,500	....	49,500
Washington	4	2	3,486,862	5	4	162.311	224,052	....	386,363	4	731	12,380	373,252
Wayne	3	3	10,879,355	3	3	473,091	2,196	....	475,287	3	3,000	2,699	469,588
Webster	4	3	4,876,440	6	5	205,760	150,000	....	355,760	5	2,607	5,606	347,547
Winnebago	6	3	11,941,101	6	3	541,893	....	....	541,893	3	15,729	33,074	493,089
Winneshiek	4	3	2.615,811	12	10	141,642	1,106,203	....	1,247,845	10	10,289	4,388	1,233,168
Woodbury	6	2	9.452,027	6	1	40,190	.	....	40,190	1	590	5,800	33,800
Worth	7	7	16,799,552	9	9	1,349,850	321,604	....	1,671,454	9	33,177	4.763	1,633,514
Wright	8	4	7,815,892	8	4	399,186	25,840	....	425,026	4	33,838	5,048	386,140
Total	705	447	1,091,897,875	778	505	49,130,966	7,920,289	1,092,808	58,143,363	505	2,891,783	2,612,842	52,638,738

MARKETS FOR IOWA CREAMERY BUTTER.

It has been shown in Table No. 4 that over 80,000,000 pounds of creamery butter was shipped to markets outside of the state during the year ending May 1, 1897. Table No. 5 is compiled to show the various markets, with quantity shipped to each. The table is compiled by counties, and reports were received from 430, located in eighty-seven counties. They report the amount shipped as 52,216,995 pounds, and billed to the following cities and states:

CITY.	AMOUNT SHIPPED.
New York	37,050,734
Chicago	4,958,211
Boston	4,217,463
Philadelphia	1,794,758
New Orleans	659,841
Cleveland	499,759
Elgin, Ill.	404,255
New Bedford	335,935
Pacific coast	298,789
Washington	222,788
New Haven	219,894
Jacksonville	200,796
Baltimore	196,280
Buffalo, N. Y.	185,484
St. Louis, Mo.	164,957
Newark	120,118
Pittsburg	111,676
Providence	109,368
STATES.	
Illinois	135,421
Rhode Island	89,337
Kentucky	43,544
Colorado	38,898
Montana	21,286
New Hampshire	15,751
Massachusetts	10,822
Ohio	10,800
Total	52,216,995

These figures show that the city of New York received 71 per cent of the shipments; Chicago, 9.5 per cent; Boston, 8.1

per cent; Philadelphia 3.4 per cent, and all other cities in the state combined 8 per cent. When compared with similar estimates made for the year ending May 1, 1896, we find that New York has made a gain of about 2.5 per cent, Chicago a loss of 8 per cent and Boston 4 per cent, Philadelphia remained the same, and other cities made a gain of 4.5 per cent. As these estimates are for shipments prior to May 1, 1897, the export trade for the past season does not appear. The shipments were made to nineteen states, including the District of Columbia.

TABLE No. 5.

Compiled by counties, showing destination and amounts of butter shipments from 430 Iowa creameries to the principal markets of the United States, together with percentage of the whole amount billed to each market, for the year ending May 1, 1897.

COUNTIES.	No. creameries reporting.	New York, 70 per cent.	Chicago, 9.5 per cent.	Boston, 8.1 per cent.	Philadelphia, 3.4 per cent.	New Orleans, 1.75 per cent.	Cleveland, 1.35 per cent.	Jacksonville, Fla., .60 per cent.	New Bedford, Mass., .96 per cent.	Elgin, Ill., 1.35 per cent.	Pacific Coast, .77 per cent.	New Haven, .64 per cent.	Washington, .66 per cent.
The state	430	87,059,734	4,958,211	4,217,468	1,794,758	659,841	499,759	200,796	335,935	404,255	298,789	219,894	232,788
Adair	2	....	194,449	42,000	....	....	....	....	....	....	....	....	....
Adams	1	25,568	51,137	42,000	....	....	66,140	....	....	....	....	....	....
Allamakee	6	469,965	90,639	....	263,775	....	....	....	....	....	....	....	....
Appanoose	.....	....	....	....	....	....	....	....	....	....	....	....	....
Audubon	4	66,860	22,700	274,835	....	....	40,000	....	....	....	....	....	....
Benton	4	117,963	66,884	11,014	9,868	....	....	....	....	....	....	....	....
Black Hawk	11	1,014,372	83,891	25,000	....	....	210,547	....	....	....	....	....	1,000
Boone	2	145,000	....	155,466	....	....	....	....	....	....	....	....	....
Bremer	17	2,358,815	51,218	10,448	....	....	164,709	....	....	....	....	....	....
Buchanan	7	1,188,843	18,672	1,800	....	....	....	....	....	....	....	....	....
Buena Vista	4	443,197	....	....	....	....	....	....	....	....	....	....	....
Butler	12	972,485	47,468	194,858	....	33,713	4,607	....	....	....	....	....	....
Calhoun	4	181,287	....	....	....	14,491	....	....	....	1,000	....	....	....
Carroll	6	187,028	21,875	....	....	....	....	....	....	....	....	....	....
Cass	.....	....	....	....	....	....	....	....	....	....	....	....	....
Cedar	8	244,260	80,200	....	....	....	....	....	....	....	....	....	....
Cerro Gordo	4	224,076	800	31,536	1,200	....	....	....	....	....	....	....	....
Cherokee	.....	....	....	....	....	....	....	....	....	....	....	....	....
Chickasaw	14	862,808	88,628	397,465	....	....	....	....	....	337,255	....	....	....
Clarke	1	....	7,000	....	....	....	....	....	....	....	....	....	....
Clay	4	340,745	2,060	....	....	....	....	....	....	....	....	....	....
Clayton	14	1,554,846	145,437	281,250	....	131,500	....	....	....	....	....	....	8,120
Clinton	1	1,220	42,685	....	....	....	....	....	....	....	....	....	....
Crawford	8	61,318	75,052	....	8,000	....	....	....	....	....	....	....	....
Dallas	2	63,800	6,000	65,000	10,000	....	....	....	....	....	....	....	....
Davis	2	63,710	....	....	....	....	....	....	....	....	....	....	....
Decatur	.....	....	....	....	....	....	....	....	....	....	....	....	....
Delaware	14	1,247,384	15,850	38,265	24,430	51,180	....	....	177,600	....	....	....	....
Des Moines	.....	....	....	....	....	....	....	....	....	....	....	....	....
Dickinson	2	145,900	....	....	....	....	....	....	....	....	....	....	....
Dubuque	19	1,197,272	24,491	80,653	10,762	3,828	....	....	....	....	....	....	....

TABLE No. 5—CONTINUED.

COUNTIES.	No. creameries reporting.	New York, 70 per cent.	Chicago, 9.5 per cent.	Boston, 8.1 per cent.	Philadelphia, 8.4 per cent.	New Orleans, 1.75 per cent.	Cleveland, 1.35 per cent.	Jacksonville, Fla., .60 per cent.	New Bedford, Mass., .98 per cent.	Elgin, Ill., 1.35 per cent.	Pacific Coast, .77 per cent.	New Haven, .64 per cent.	Washington, .66 per cent.
Emmet	2	137,750	28,295										
Fayette	14	1,394,407	414,031	93,013	606								
Floyd	3	510,000	7,000										
Franklin	7	337,693	77,018	26,400	4,180								
Fremont													
Greene	3	198,137	9,500										
Grundy	8	646,328	41,000	139,555	4,725		1,165						
Guthrie	3	130,219		70,000	140,000								
Hamilton	3	373,951	5,000	27,456		25,000							
Hancock	2	117,965											
Hardin	9	6,331,936	178,553		11,238								
Harrison	1		12,881										
Henry	2	32,700	9,964										
Howard	3	577,733	66,668	1,740									
Humboldt	5	239,829	161,642		52,800								
Ida	1	125,000											
Iowa	2	129,000	13,000	6,500									
Jackson	9	68,588	411,750		39,740								
Jasper	6	297,540	84,000	30,540	100,000		7,284						
Jefferson	5	72,724	113,000	5,805					152,923				
Johnson	3	6,232	111,122		2,707								
Jones	12	906,487	75,502	1,099,559	26,117	28,120					12,888		
Keokuk	2	168,355	3,689										
Kossuth	14	1,176,973	355,886		199,321	39,884							
Lee	1		4,409										
Linn	16	660,930	120,281	108,700	2,000	7,600		200,796					
Louisa	1	30,000											
Lucas	1	87,515											
Lyon	1	28,305	14,152	57,267									
Madison	2				70,000								
Mahaska													
Marion	2		15,140		540								
Marshall	5	35,465	58,295	520,024							11,520		
Mills	1		24,000		24,000								56,668
Mitchell	6	992,044									242,881		
Monona													
Monroe													

Montgomery	1	65,081											
Muscatine	4	85,200	20,400			206,049							
O'Brien	2	106,239	16,078										
Osceola													
Page	1		600								82,000		
Palo Alto	11	1.147,686	86,369										
Plymouth	5	333,960	169,108		26,228								
Pocahontas	4	143,266	3,000	74,640		119,985							
Polk													
Pottawattamie	8	24,400	457,468										
Poweshiek	1		36,000										
Ringgold	1	6,168											
Sac	9	506,814	136,944		53,081								
Scott	1		3,800										
Shelby	1	20,440		40,880									
Sioux	6	911,885	19,750	22,434									
Story	12	689,882	110,748	110,461									
Tama	5	13,452	80,594	3,549	26,027		5,357						
Taylor	8	181,144	3,145										
Union	4	120,600	88,224							66,000		219,894	162,000
Van Buren	1	1,334											
Wapello													
Warren	1		20										
Washington	3	252,900											
Wayne	2				70,125				5,412				
Webster	5	211,169	70,778	64,000									
Winnebago	8	473,733	620										
Winneshiek	10	342,400	74,772	113,850	618,294								
Woodbury	1		33,800										
Worth	9	1,601,684	9,080										
Wright	8	386,020											
Total	430	37,050,784	4,958,211	4,217,463	1,794,758	659,841	499,759	200,796	335,935	404,255	298,789	219,891	222,788

NOTE.—The states receiving shipments aggregating less than 100,000 pounds are as follows: Rhode Island, 89,337; Kentucky, 43,544; Colorado, 38,898; Montana, 21,296; New Hampshire, 15,751; Massachusetts, 10,822; Ohio, 10,800.

COMPARATIVE COST OF MANUFACTURING CREAMERY BUTTER.

In the creamery report blank sent to all Iowa creameries, reprinted in preceding pages of this report, under No. 17 the following questions were asked: "State the average yearly cost per pound of manufacturing separator butter, including the cost of package, but not the cost of delivering milk." "State the average yearly cost of manufacturing gathered cream butter per pound, including cost of package and the gathering of cream." The interest manifested in this particular part of the creamery system led to the propounding of these questions. Answers were received from 238 separator creameries, located in 56 counties, and 51 gathered cream plants, located in 30 counties. The number reporting is sufficient to make a just comparison between the two methods as regards the cost of manufacturing a pound of butter, but it should be remembered that in the estimates given for gathered cream butter the cost of collecting the cream is included; whereas for separator butter the cost of delivering milk is not so included. As the cost of manufacturing depends to a more or less extent upon the pounds of butter made, the creameries reporting were divided into four classes. In the first class all creameries receiving less than 1,500,000 pounds of milk were placed; those receiving more than 1,500,000 and less than 2,500,000 in class 2; those receiving more than 2,500,000 and less than 3,500,000, class 3, and those receiving more than 3,500,000 pounds of milk are included in class 4. In the classification of the gathered cream, those manufacturing less than 50,000 pounds of butter per year are included in class 1; those manufacturing 50,000 and less than 100,000 pounds in class 2; those manufacturing 100,000 pounds and less than 150,000, class 3, and those manufacturing over 150,000 are included in class 4. Only those creameries reported as covering the entire year were used in this compilation. The following is a recapitulation of the results obtained, in accordance with the classification, together with the average for the 238 separator creameries, and the 51 creameries manufacturing gathered cream butter:

SEPARATOR BUTTER.

Cost of manufacturing separator butter per pound, including cost o1 package, arranged in classes, according to the amount of milk received.

CLASS.	Number reported.	Total lbs. milk received.	Average lbs. per creamery.	Average cost per lb. for manufacturing.
One	66	61,071,512	925,325	.0292
Two	65	127,553.272	1,962,358	.0233
Three	45	132,926,740	2,953,927	.0220
Four	62	318,104,017	5,130,709	0203
Total	38	639,656,541	2,743,097	.0285

GATHERED CREAM BUTTER.

Cost of manufacturing gathered cream butter per pound, including the cost of package and the gathering of cream; arranged in classes, according to the number of pounds of butter manufactured.

CLASS.	Number reported.	Total lbs. butter manufactured.	Average lbs. per creamery.	Averge cost per lb. of gathering cream and manufacturing butter.
One	16	497,241	31,077	.0343
Two	12	980.949	81,745	0368
Three	7	937,357	133,908	.0331
Four	16	4,050,394	253,149	.0280
Total	51	6,465,941	124,967	.0330

By a comparison of the separator classes, we find a difference of .80 cents per pound in the cost of manufacturing between Classes No. 1 and 4, and between Classes No. 2 and 3 but a slight difference. This may be accounted for in that when a creamery receives such an amount of milk as to cause the employment of extra help, unless the increase is correspondingly large, the cost of manufacturing a pound of butter will be increased. The gathered cream classes show a difference between Classes No. 2 and 4, of .88 cents and also Class No. 1, with an average of only 31,077 pounds per year, has a lower average cost per pound than Class No. 2, with an average make of 81,745 pounds. This we are unable to account for.

By comparing the cost of the two systems, the separator butter is manufactured at .95 cents per pound less than the gathered cream, the former costing, on an average for the 238 creameries, .0285 cents, and the latter, for 51 creameries, .0331 cents per pound. How far the .95 cents would go toward paying the cost of delivering the milk to the separator creameries is hard to determine, and in fact will depend much upon the conditions and circumstances surrounding each creamery. Where the delivery of milk is done by paid haulers, the average price will be very close to 10 cents per hundred weight, which is about two and one-quarter cents per pound of butter. This would show a difference of about one and one-fourth cents in favor of the gathered cream system, however, since many of the separator creamery patrons deliver their own milk, another complication arises, making comparisons of these two systems all the more difficult.

IOWA BUTTER MAKERS.

Table No. 6 contains information pertaining to the butter-makers and other employes concerned in the operation of the creamery. The figures and totals, with the exception of the number of full creameries, are compiled for the year ending May 1, 1897. As it is impossible to know the number of creameries at that date, in making estimates the 773 creameries manufacturing butter and in operation November 1, 1897, are used. Four hundred and eighty-seven creameries, located in 90 counties, reported the average wages paid butter-makers for different seasons of the year, and also for those employed the entire year at a uniform price. Their averages are as follows, arranged by counties: 59 counties report the salaries during the winter season to be $42.16 per month; the highest average for any one county is $60 per month, and the lowest $20. Fifty-nine counties report the averages for summer months to be $52.95. The highest average for this season is $65, and the lowest $30. Eighty-two counties report the average wages paid during the entire year as $60. The highest average for any county where uniform wages are paid for the entire year is $80 and the lowest $28 per month. When the average for the state for different seasons and for the entire year is considered, the results obtained are not surprising; but when the highest and lowest wages for respective periods are compared, the difference is so large that one is at first led to doubt their accuracy, and an explanation may be warranted in this connection. In many cases where the butter-maker receives what may seem high wages, in addition to the ordinary duties of a butter-maker he may have the full or partial management of the creamery, or, in some instances, he is required to furnish extra help at his own expense during the season of the year when the output is large. On the other hand, many creameries are obliged, on account of light business, to either close their plants during part of the year or reduce expenses to the lowest point, and in these cases the butter-maker, rather than be out of employment, is forced to accept low wages, with the hope that the next season will result in more business and better wages. There are two other factors entering into the wage question to a large extent. The butter-maker who can at all times and under all circumstances produce an article of butter of a uniformly fine quality is sought for and can command a good salary, while others are unprogressive, content with past methods, and satisfied if their goods are taken by the trade, even at a price considerably under the highest quotations. Not to underestimate the importance of the patron doing his part by delivering a fine quality of milk to our creameries, we are of the opinion that with the present and future butter-maker of our state rests to a large degree the maintenance of the reputation that Iowa butter now enjoys. That a higher standard of excellence in the quality of butter will be demanded cannot be questioned, and the future butter-maker, in order to meet these demands, must be a student, as well as worker. He must put brains into his work, and not be content with the fact that the commission merchant receiving his make reports "one-half cent above" realized on his goods. This practice has much to do in influencing the managers and butter-makers to be content with their present condition. In other words, when meeting with these parties at their creameries or elsewhere, and the importance of improving the quality is mentioned, invariably the answer is, "Our butter is all right; we receive one-half cent above." This answer is so uniform that the creameries not receiving this favor may be classed in the minority. Is not this method of doing business entirely too misleading? and does not the extent to which it is used warrant a reform in the present method in market quotations in our trade centers, or the addition to the list of superior quality as is now quoted? The future responsibility of the Iowa butter-maker should be recognized, by both patron and creamery manager, and the wages paid should be commensurable with the responsibility and duties required of him. As a complete separation of the cream from the milk and an exhaustive churning, together with a fine quality of butter, are the essential requirements, the inexperienced and careless butter-maker may be an expensive investment at any price, while on the other hand no better investment can be made than to secure the services of one competent to accomplish these results. With an annual shipment to markets outside of the state which will soon aggregate 100,000,000 pounds of butter, an improvement in quality equal to 1 cent per pound would add $1,000,000 each year to the resources of the state. This can be accomplished by more thorough study and greater experience. The dairy school connected with the agricultural college at Ames is assisting in this direction and should be encouraged. With young men educated in the scientific and mechanical work connected with the creamery system, and afterwards gaining practical experience in our creameries, we shall expect greater and quicker results than have been made in the past.

SEPARATORS AND FUEL USED IN CREAMERIES.

One of the most important subjects at the present time connected with our creamery system is that pertaining to the expense of delivering the milk and cream to the factory. The information obtained in this connection is entirely unsatisfactory. An effort was made to obtain some figures that would be of practical use in connection with this subject, but answers are so uncertain that in many instances they were of no value whatsoever. The fact that part of the milk received at many factories is delivered by patrons themselves, makes it impossible where a given amount is paid for hauling, to arrive at any average price per hundred weight that could be satisfactorily used in obtaining an estimate of what is directly expended in the delivery of milk. From the best reports obtainable the following results are derived. Four hundred and one creameries report the number employed in collecting milk, other than patrons themselves, to be 1,925, and cream 519.

TABLE No. 6.

Creameries—Number employing butter-makers, and amount paid butter-makers and employes.

COUNTIES.	NUMBER OF EMPLOYES; AMOUNT PAID BUTTER-MAKERS, ASSISTANTS AND FOR COLLECTING MILK AND CREAM, TOGETHER WITH WHOLE AMOUNT PAID ALL EMPLOYES FOR THE YEAR ENDING MAY 1, 1897.														
	Total number creameries.	Number of butter-makers reported.	Average wages paid—winter months.	Average wages paid—summer months.	Average wages paid butter-makers throughout the year.	Total amount paid butter-makers.	Number of assistants employed.	Average wages paid per month to assistants.	Total amount paid to assistants.	Number reporting.	Number employed collecting milk.	Amount paid for collecting milk.	Number employed collecting cream.	Amount paid for collecting cream.	Total number employed.	Total amount paid all employes.
The state	773	487	$42.16	$52.95	$50.04	$292,690	302	$26.47	$ 78,855	401	1925	$368,732	519	$150,707	3233	$890,344
Adair	2	2	50.00	50.00	50.00	1,000	2	27.50	540	2	12	....	.....	....	16	1,540
Adams	3	1	....	....	75.00	900	1	30.00	180	2	25	1,500	.....	....	27	2,580
Allamakee	9	9	47.50	57.50	41.84	4,544	7	31.66	1,623	8	31	4,750	57	15,608	104	26,525
Appanoose	......	......	....	....	....	....	....	....	....	......	......	....	.....	....	......	....
Audubon	5	4	....	....	50.00	3,803	4	17.00	1,104	5	41	9,041	.....	....	49	13,948
Benton	11	3	25.00	40.00	37.50	1,080	3	45.80	990	5	23	1,423	8	4,050	37	7,543
Black Hawk	19	14	50.00	51.00	60.71	8,230	6	24.58	1,840	12	59	10,107	.....	....	79	20,177
Boone	6	1	60.00	70.00	....	1,280	3	30 50	750	3	13	100	2	....	19	2,130
Bremer	24	20	56.25	63.00	64.33	15,025	2	23.75	480	11	10	2,945	.....	....	33	18,450
Buchanan	14	8	....	....	59.28	5,880	5	30 40	1,320	9	50	26,812	.....	....	63	34,012
Buena Vista	8	6	62.50	57.50	53 33	4,135	4	27 00	1.090	6	38	2,802	18	710	66	8,737
Butler	20	13	37.50	49.00	52 00	8,434	8	47.80	2,490	13	57	1,200	15	....	93	12,124
Calhoun	7	4	35.00	45.00	45.00	2,060	1	20.00	140	3	7	....	.....	....	12	2,200
Carroll	10	6	47.50	60.00	57.50	4,320	3	21.66	660	5	12	4,000	.....	....	21	8,980
Cass	1	......	....	....	....	....	....	....	....	......	......	....	.....	....	......	....
Cedar	7	3	30.00	55.00	51 66	1,920	2	36.66	720	5	12	300	38	6,700	55	9,640
Cerro Gordo	11	3	45.00	57.50	42.50	1,740	3	38.25	1,098	5	18	4,206	3	....	27	7,044
Cherokee	7	......	....	....	....	....	....	....	....	3	......	....	.....	....	......	....
Chickasaw	20	15	42.50	60.00	59.27	11,554	10	24.68	2,520	14	74	12,561	10	15.821	109	42,456
Clarke	2	......	....	....	....	....	1	25.00	200	1	7	....	.....	....	8	200
Clay	9	7	47.00	70.00	40 83	3,095	2	37.50	500	7	24	1,711	.....	....	33	5,306
Clayton	20	18	58.50	65.00	52.64	12,054	9	35 17	3,520	16	127	28,033	12	5,947	166	49,554
Clinton	7	1	25.00	50 00	....	425	....	....	....	1	4	300	2	300	7	1,025
Crawford	5	2	....	....	40.00	960	1	18.50	144	1	4	....	.....	....	7	1,104
Dallas	6	4	....	....	50.00	2,250	3	27.50	860	4	27	....	12	2,000	47	5,110
Davis	3	2	....	....	38.50	930	2	20.00	240	3	4	....	.....	....	8	1,170

TABLE No. 6—CONTINUED.

NUMBER OF EMPLOYES, AMOUNT PAID BUTTER-MAKERS, ASSISTANTS AND FOR COLLECTING MILK AND CREAM, TOGETHER WITH WHOLE AMOUNT PAID ALL EMPLOYES FOR THE YEAR ENDING MAY 1, 1897.

COUNTIES.	Total number creameries.	Number of butter-makers reported.	Average wages paid—winter months.	Average wages paid—summer months.	Average wages paid butter-makers thro'-out the year.	Total amount paid butter-makers.	Number of assistants employed.	Average wages paid per month to assistants.	Total amount paid to assistants.	Number reporting.	Number employed collecting milk.	Amount paid for collecting milk.	Number employed collecting cream.	Amount paid for collecting cream.	Total number employed.	Total amount paid all employes.
Decatur	1	....	......	......	.....	......	.....	......	......	1	5	......	.....	......	5	......
Delaware	24	19	47.60	58.60	55 46	11,414	9	23.44	2,103	14	54	5,608	2	......	84	19,125
Des Moines	...	....	......	......	.....	......	.....	......	......	.....	.....	......	.....	......	.....	......
Dickinson	3	3	....	......	61 66	1,980	2	30.00	210	8	12	3,400	.....	......	17	5,590
Dubuque	28	20	34.62	46.88	49.19	10,851	6	18 25	1,155	12	58	14,653	.....	......	79	28,659
Emmet	4	2	..		51 06	1,130	2	22.50	5,750	2	.....	......	.....	......	4	6,880
Fayette	21	17	30.00	42.50	60 14	11,950	4	20.77	3,076	13	97	35,688	5	2,625	123	53,339
Floyd	6	4	20.00	35.00	57.00	2,390	3	23.33	480	6	27	7,864	4	473	38	11,207
Franklin	10	9	32.66	43.66	58.30	5,310	4	23.25	566	9	47	6,043	8	......	68	11,919
Fremont	..	.....	......	......	.....	......	.....	......	......	.....	.....	......	.....	......	.....	......
Greene	8	4	35.00	50.00	41.66	1,500	3	25.00	340	4	31	5,984	.....	......	38	7,824
Grundy	17	9	......	......	46.66	8,935	10	24.99	2,111	9	53	17,095	8	4,958	80	28,099
Guthrie	5	4	......	......	45.00	2,040	4	23 00	804	3	23	......	8	700	39	3,544
Hamilton	9	3	55.00	60.00	40 00	2,760	5	31.50	1,932	4	13	1,865	.....	......	21	6,557
Hancock	8	2	....	......	44.33	978	2	10 00	240	5	8	......	2	600	14	1,818
Hardin	12	7	46.25	55.00	53 33	4,030	7	22.85	1,017	9	88	7,330	9	3,101	61	15,478
Harrison	6	1	......	......	57.50	780	1	27.00	216	9	.....	......	.....	......	2	996
Henry	8	1	......	......	30 00	360	1	30.00	270	2	18	2,450	.....	......	15	3,060
Howard	7	6	47.50	50.00	45.20	3,502	3	34.00	1,069	7	32	8,699	29	6,647	70	19,937
Humboldt	9	5	......	...	60.00	3,240	5	24.16	615	5	25	5,755	.....	......	35	9,610
Ida	5	2	40.00	50.00	35.00	550	2	33.50	706	1	6	4,000	.....	......	10	5,256
Iowa	6	2	30.00	45 00	40.00	1,200	2	32.50	855	4	.....	2,500	23	4,800	26	9,355
Jackson	13	10	31.00	52 00	40.00	4,575	6	29.16	1,180	8	12	400	16	3,739	44	9,894
Jasper	9	6	43.50	46.25	41.66	3,000	4	25.25	707	7	44	6,695	10	950	64	11,852
Jefferson	8	5	47.50	60.00	45.00	2,910	3	19.00	234	5	39	11,851	4	330	51	14,825
Johnson	7	3	26.00	40 00	47.50	1,336	1	8.00	394	4	7	900	11	500	23	3,130
Jones	17	14	47.50	62.50	53.18	8,480	5	33.00	1,585	11	23	900	.....	......	41	10,965
Keokuk	4	2	25.00	50.00	.... ..	1,000	4	51 00	904	2	20	......	12	......	33	1,904
Kossuth	20	18	44.50	53.50	55.00	11,990	10	28.40	3,018	14	16	3,800	.....	......	44	18,808
Lee	2	1	....	......	30.00	360	1	25.00	150	2	5	870	3	950	10	2,330
Linn	24	17	26.33	40.00	47.08	9,114	6	21.80	1,866	18	41	5,904	.....	......	64	16,884
Louisa	8	1	......	......	35.00	420	1	35.00	420	2	.....	......	8	1,000	10	1,840

....	1	......	....	....	....	....	......	....	....	1	......	....	......	....	....	....
Lyon........................	3	2	30.00	40.00	68 00	1,196	1	24 00	120	1	3	....	.	......	6	1,316
Madison........................	3	1	....	....	50.00	600	1	20.00	120	....	......	....	..	...	2	720
Mahaska........................	1	1	....	....	40.00	480	1	29.00	318	1	....	....	12	3,800	14	4,628
Marion........................	5	1	35.00	45.00	....	160	......	......	....	5	......	....	6	448	7	608
Marshall........................	7	6	44.50	51.75	50.00	3,570	5	49.28	683	7	32	6,246	20	10,085	63	20,584
Mills........................	3	2	25 00	30.00	28.00	666	2	28.00	336	3	16	1,675	17	2,000	37	4,677
Mitchell........................	8	7	43.33	50.00	54.25	4,236	5	26.00	552	7	5	....	31	16,009	48	20,797
Monona........................	2	1	30.00	40.00	....	430	......	....	....	1	..	....	......	....	1	430
Monroe........................	1	......	....	....	....	....	......	....	....	.....	......	....	......	....	....	....
Montgomery........................	1	1	60.00	60.00	....	660	....	....	....	1	......	....	......	....	1	660
Muscatine........................	4	4	40.00	47.50	45.00	2,130	1	20.00	120	4	21	7,600	15	6,900	41	16,750
O'Brien........................	4	4	37.50	47.50	65.00	2,400	2	15.00	225	4	8	750	....	....	14	3,375
Osceola........................	4	......	....	....	....	....	......	....	....	......	......	....	......	....	....	....
Page........................	7	3	....	....	40.00	360	4	10 00	240	3	8	1,200	......	....	15	1,800
Palo Alto........................	16	18	45.00	55.00	50.71	7,800	9	23 44	1,700	11	2	....	....	....	24	9,500
Plymouth........................	10	5	45.00	56.00	57.50	4,110	4	20.25	551	6	14	3,276	......	....	23	7,937
Pocahontas........................	9	5	48.75	56.25	..	3,030	2	37.50	250	5	18	4,078	......	....	25	7,358
Polk........................	6	5	35.00	47 50	55.00	2,880	4	25.50	302	3	7	1,416	......	....	16	4,598
Pottawattamie........................	5	5	....	....	63 75	3,360	4	37.50	790	4	14	4,603	15	7,500	33	16,253
Poweshiek........................	5	1	....	....	60.00	240	2	19.00	294	2	7	....	......	....	10	534
Ringgold........................	8	1	....	....	50 00	750	......	....	....	4	9	1,000	......	....	10	1,750
Sac........................	14	6	50.00	55.00	50.00	3,330	10	31.41	2,138	7	19	3,446	......	....	35	8,914
Scott........................	4	2	....	......	45.00	680	1	30.00	240	2	10	2,376	......	....	13	3,296
Shelby........................	5	1	....	....	57.50	900	1	15.00	1,696	3	19	2,656	6	1,600	27	6,852
Sioux........................	8	5	50.00	60 00	58.75	2,960	2	35.00	560	5	5	600	......	....	12	4,120
Story........................	16	13	44.26	53 66	45.00	8,095	8	30.00	2,630	12	48	10,144	......	....	69	20,869
Tama........................	8	3	60.00	65.00	43 33	1.190	2	30.00	270	7	4	6,000	10	2,040	19	9,500
Taylor........................	6	4	30.00	50.00	46.66	2,160	2	15.00	260	6	29	4,500	1	416	38	7,336
Union........................	5	4	55.00	62.00	57.50	2,710	6	26.50	1,549	4	12	1,500	......	....	22	5,759
Van Buren........................	2	1	....	....	50.00	100	......	....	95	2	5	1,300	6	400	12	1,895
Wapello........................	5	1	....	....	50 00	1,100	2	33.50	600	4	15	....	1	....	19	1,700
Warren........................	4	2	....	....	45.00	640	.....	....	....	3	18	1,800	......	....	20	2,440
Washington........................	5	3	....	....	41.66	1,420	4	26.25	1,170	4	29	11,360	......	....	36	13,950
Wayne........................	3	2	....	....	50 00	950	5	30.41	1,530	3	51	2,570	2	....	60	5,050
Webster........................	6	2	....	....	42.50	720	1	26.00	26	5	14	3,775	......	....	17	4,521
Winnebago........................	6	5	45.00	57.50	30.00	3,660	2	10.00	182	2	......	....	......	....	7	3,842
Winneshiek........................	12	8	48.33	61.66	50.00	4,695	3	23.66	643	10	43	14,775	23	11,150	77	31,263
Woodbury........................	6	1	....	....	45.00	480	2	24.00	252	3	8	....	......	....	11	732
Worth........................	9	9	48.00	60.00	60.00	6,268	4	22.00	866	7	......	....	15	5,890	28	13,024
Wright........................	3	4	33.33	43.33	55.00	2,250	2	26 00	516	5	10	1,541	.....	....	16	4,307
Total........................	778	487	$43.16	$52.95	$50.04	$292,690	302	$26.47	$ 78,855	401	1925	$368,783	519	$150,707	3233	$890,344

Table No. 7 contains information not hitherto appearing in the annual reports of this department. Five hundred and fourteen creameries and skim stations, out of a total of 823 in operation, report 1,316 separators in use. Of this number, 764 are of the De Laval manufacture, 222 Sharples, 54 Jumbo, and 276 Read. Taking the number reported by 514 creameries as a basis, there would be 2,100 separators used in the total number of creameries and skim stations. Of the 514 reporting on milk testers, 485 use Babcock and 29 the Russian. It will be seen from Table No. 7, that out of 445 reporting on the kinds and amount of fuel used, 80 report using wood, leaving 365 using 38,784 tons of coal. Of this amount 28,444 tons was mined in Iowa, and 10,340 tons was mined outside of the state. Reports were made from all counties in the state having creameries, with the exception of one. Eighty-two per cent of the creameries reported burn coal. At this ratio, 634 of the total number in the state use coal, and 139 use wood. No reliable figures as to the quantity of wood used were obtained. The amount of coal used per creamery would be 106 tons annually, and for the 636 creameries using coal, an estimate upon this basis would require 67,206 tons. The figures also show that about two-thirds of the coal used is Iowa mined, and one-third foreign. From Table No. 7 can be found those counties where Iowa and foreign coal are respectively used. But in this connection it must be considered that the amount given does not represent the amount used, as in but few counties has a report upon this question been received from all the creameries. Those sections of the state where the mining of coal is a leading industry, should be interested in the creamery branch of the dairy industry of our state, as creameries are on the increase and their permanency is undoubtedly established. The quantity of coal used by them annually is worthy of their consideration and their efforts to supply.

TABLE No. 7.

Creameries and skim stations—Number operating separators, number and kind of separators and milk testers used, and number tons of Iowa and foreign mined coal used.

COUNTIES.	Number of creameries and skim stations operating separators.	Number reporting.	Number of separators in use.	SEPARATORS.				TESTERS.		NUMBER TONS OF IOWA AND FOREIGN COAL USED IN CREAMERIES, AND NUMBER USING WOOD.				
				De Laval.	Sharpless.	Jumbo.	Reid.	Babcock.	Russian.	Number reporting.	Iowa coal.	Foreign coal.	Total tons of coal used.	Number creameries reported as using wood.
The state	823	514	1,316	764	222	54	276	485	29	445	28,444	10,340	38,784	80
Adair	9	2	7	5	......	2	......	1	......	2	240	....	240	......
Adams	8	2	12	12	....	......	......	......	2	1	340	....	340	......
Allamakee	5	3	8	6	......	......	2	3	......	5	....	....	....	5
Appanoose	......	......	......	......	......	......	......	......	......	......	....	....	....	......
Audubon	6	5	10	10	......	......	......	5	......	4	440	....	440	......
Benton	11	6	11	8	......	......	3	5	......	6	547	....	547	2
Black Hawk	19	15	48	18	16	......	9	12	1	12	540	909	1,449	......
Boone	7	4	12	11	1	......	......	3	......	3	200	....	200	1
Bremer	24	23	68	41	11	2	8	12	2	18	....	1,804	1,804	......
Buchanan	15	10	29	3	1	3	22	7	......	4	50	540	590	......
Buena Vista	10	8	21	12	2	3	4	2	......	2	330	....	330	......
Butler	21	18	40	20	13	3	4	13	......	11	442	456	898	1
Calhoun	7	5	8	6	......	......	2	2	1	3	308	....	308	......
Carroll	12	9	16	7	3	....	6	4	......	4	465	....	465	......
Cass	7	2	16	16	......	......	......	1	1	1	300	....	300	......
Cedar	8	3	10	6	2	......	2	1	......	2	75	129	204	......
Cerro Gordo	11	6	12	10	2	......	......	4	......	5	458	....	458	......
Cherokee	7	5	7	4	3	......	......	3	......	1	30	....	30	......
Chickasaw	19	14	37	26	6	......	5	8	......	18	82	991	1,073	3
Clarke	4	1	1	1	......	......	......	1	......	1	50	....	50	......
Clay	9	9	14	10	2	......	2	8	1	6	466	127	593	....
Clayton	21	17	40	17	1	6	16	14	2	18	495	102	597	10
Clinton	15	7	11	5	2	4	......	5	......	5	120	245	365	1
Crawford	8	3	6	5	1	......	......	3	......	1	60	....	60	......
Dallas	6	3	4	2	2	......	......	3	......	3	290	....	290	......
Davis	3	3	3	......	2	......	1	3	......	2	120	....	120	......
Decatur	2	......	......	......	......	......	......	......	......	......	....	....	....	......

TABLE No. 7—CONTINUED.

COUNTIES.	Number of creameries and skim stations operating separators.	Number reporting.	Number of separators in use.	SEPARATORS.				TESTERS.		NUMBER TONS OF IOWA AND FOREIGN COAL USED IN CREAMERIES, AND NUMBER USING WOOD.				
				De Laval.	Sharpless.	Jumbo.	Reid.	Babcock.	Russian.	Number reporting.	Iowa coal.	Foreign coal.	Total tons of coal used.	Number creameries reported as using wood.
Delaware	27	19	48	21	5	1	21	7	10	13	733	311	1,044	5
Des Moines	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Dickinson	8	3	6	5	1	....	....	3	....	2	180	....	180	....
Dubuque	26	20	47	13	12	4	18	15	1	18	32	153	185	15
Emmet	4	2	4	1	3	....	....	1	....	2	110	90	200	....
Fayette	23	18	54	23	6	....	25	16	....	12	....	782	782	6
Floyd	5	5	12	8	4	....	....	5	....	5	80	217	297	....
Franklin	10	9	20	14	2	....	4	8	....	7	536	....	536	....
Fremont	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Greene	9	4	7	4	2	....	1	3	....	3	311	....	311	....
Grundy	18	11	27	17	7	....	3	11	....	9	315	887	1,202	....
Guthrie	9	4	11	4	6	....	1	4	1	2	200	....	200	....
Hamilton	10	6	12	10	2	....	....	6	....	5	503	....	503	....
Hancock	6	5	6	5	....	1	....	5	....	2	86	20	106	....
Hardin	10	10	18	15	....	2	1	9	....	8	547	....	547	....
Harrison	7	5	9	4	....	5	....	4	1	2	....	....	....	2
Henry	3	3	3	2	1	....	....	3	....	3	50	....	50	2
Howard	6	4	9	9	....	....	....	3	....	4	120	170	290	1
Humboldt	10	8	16	15	....	....	1	5	....	6	709	....	709	....
Ida	5	4	6	4	2	....	....	4	....	3	270	....	270	....
Iowa	2	....	....	....	....	....	....	....	....	3	180	....	189	....
Jackson	15	10	24	3	15	....	6	7	....	6	40	253	293	3
Jasper	10	7	14	9	4	....	1	7	....	6	690	....	690	..
Jefferson	10	7	16	13	2	....	....	7	....	7	221	....	221	3
Johnson	6	3	4	2	2	....	1	3	....	3	185	....	185	1
Jones	26	16	87	50	16	....	21	8	8	11	1,961	100	2,061	2
Keokuk	5	4	6	6	....	....	....	2	....	4	368	....	368	....
Kossuth	20	20	42	38	1	....	3	18	....	14	1,618	176	1,794	....
Lee	1	1	1	1	....	....	....	1	....	2	65	....	65	....
Linn	27	17	40	8	....	....	32	16	....	15	1,032	385	1,417	4
Louisa	1	....	....	....	....	....	....	....	....	2	20	....	20	....
Lucas	1	1	2	2	....	....	....	1	....	1	126	....	126	....

Lyon	3	3	8	5	......	2	1	4	......	2	60	60	120	......
Madison	4	2	3	.....	......	2	1	2	......	1	......	......	......	1
Mahaska	1	.....	.....	.....	......	......	.....	.....	......	1	100	......	100	......
Marion	4	3	4	1	......	3	.....	3	......	1	16	......	16	......
Marshall	5	5	7	1	......	......	6	4	......	5	533	......	533	......
Mills	1	1	1	1	......	......	.....	1	......	2	170	......	170	......
Mitchell	3	1	1	1	......	......	.....	1	......	4	......	237	237	......
Monona	2	.....	.....	.....	......	......	.....	.....	......	1	......	......	......	1
Monroe	1	1	1	1	......	......	.....	1	......	1	80	......	80	......
Montgomery	2	1	2	.....	2	......	.....	1	......	1	85	......	85	......
Muscatine	5	3	4	3	1	......	.....	2	......	4	360	......	360	......
O'Brien	4	4	9	1	6	......	2	2	......	1	35	......	35	......
Osceola	4	1	2	2	......	......	.....	1	......	.....	......	......	......	......
Page	7	5	6	3	2	1	.....	5	......	1	......	95	95	......
Palo Alto	16	13	27	22	4	......	1	13	......	8	825	100	925	......
Plymouth	10	8	13	6	5	......	2	6	......	3	270	183	353	......
Pocahontas	9	8	13	7	......	......	6	8	......	4	468	......	468	......
Polk	6	6	11	7	2	1	1	3	1	4	528	......	528	......
Pottawattamie	4	3	5	.....	5	......	.....	2	1	4	414	......	414	......
Poweshiek	5	2	3	1	......	......	2	2	......	.....	......	......	......	......
Ringgold	3	3	3	3	......	......	.....	3	......	4	18	......	18	1
Sac	14	9	21	10	2	......	9	8	......	7	649	......	649	......
Scott	3	2	2	1	......	1	.....	2	......	2	......	......	......	2
Shelby	6	4	8	7	......	......	1	4	......	3	311	......	311	......
Sioux	9	7	13	2	11	......	.....	3	......	6	615	......	615	......
Story	16	16	32	20	5	2	5	16	......	8	1,228	......	1,228	......
Tama	4	5	6	4	1	......	1	4	......	5	254	24	278	......
Taylor	7	6	7	5	2	......	.....	6	......	5	411	......	411	......
Union	13	5	23	21	......	......	2	3	1	4	453	......	453	......
Van Buren	2	1	1	.....	1	......	.....	1	......	.....	......	......	......	......
Wapello	5	4	7	3	......	3	1	4	......	2	165	......	165	......
Warren	4	3	3	.....	1	2	.....	3	......	1	120	......	120	......
Washington	4	2	3	1	2		.....	2	......	4	340	......	340	......
Wayne	6	3	18	15	......	......	3	3	......	3	154	350	504	......
Webster	4	3	7	3	......	......	4	3	......	5	920	......	920	......
Winnebago	12	6	15	15	......	......	.....	6	......	4	20	362	382	......
Winneshiek	4	4	7	5	2	......	.....	3	......	10	480	......	480	6
Woodbury	6	5	6	3	3	......		4	......	1	96	......	96	......
Worth	8	6	13	10	1	......	2	5	......	9	529	82	611	2
Wright	9	7	8	5	1	1	1	6	......	1	150	......	150	......
Total	823	514	1,816	764	282	54	276	485	29	445	28,444	10,340	38,784	80

BUTTER FAT AND CHURN YIELD OF MILK.

For the tenth annual report information was obtained and compiled in Table No. 14, pertaining to the per cent of butter fat in milk delivered to our creameries during each month of the year ending May 1, 1896. For the present report, similar information has been gathered and compiled in Table No. 8, so an effort was also made to obtain information relating to the amount of butter produced from 100 pounds of milk, or, in other words, the churn yield of milk. This information will be found in Table No. 9, and is entirely new. Like the table showing butter fat, it is compiled by months for the year ending May 1, 1897. In the compilation of Tables Nos. 8 and 9, only the reports of those creameries operating the entire year and furnishing information for each month were used, this being the only way in which a correct comparison by months can be made. One hundred and thirty creameries, located in 49 counties, made such reports on the per cent of butter fat, and 118 creameries, located in 47 counties, on the per cent of butter, or churn yield. From these tables it will be seen that the average per cent of butter fat for the 130 creameries for the 12 months was 3.80. The table for 1896 shows 3.84. The per cent of butter for the 118 creameries for the same length of time was 436. This is a difference of .56 in favor of butter, or an over-run, of 15 per cent. By comparison of the different months, the per cent of over-run can be ascertained for each month, and it will be found that for November it reached 17 per cent and in April 13 per cent. These two tables, for a person interested in this subject, furnish an opportunity for study. The highest per cent of butter fat from any one county was reported from Johnson county, and was 4.03 per cent. The lowest was 3.60 per cent, from 3 counties, namely, Franklin, Henry and Shelby. Thus it will be seen that there was a difference of .43 per cent between the highest and lowest average test of butter fat. From the table of butter yield, the highest per cent was 4.79, from Sioux county, and the lowest 3.98, from Jackson. This is a difference of .81, or 20 per cent. The two counties here referred to had but one report each, and one might be led to think that the report from Jackson county likely was intended for butter fat, in place of butter, but this is not the case, as the number of pounds of milk received during the year and the average per cent of butter made, equal the total pounds of butter manufactured. The same is true of the creamery in Shelby county. The information contained in the two tables does not especially represent the same creameries, for in many instances a creamery will report on butter fat and not on churn yield, or vice versa. The following is a recapitulation of the monthly averages for butter fat and butter:

MONTH.	Per cent butter fat.	Per cent butter yield.	Overrun.	Per cent overrun.
1896.				
May	3.53	4.08	.55	15.3
June	3.55	4 04	.51	14 4
July	3.62	4.16	.54	15.0
August	3.70	4 26	.56	15.0
September	3.87	4.45	.58	15.0
October	3 94	4.55	.61	16.0
November	4.07	4.76	.69	17.0
December	4.01	4.62	.61	15.2
1897.				
January	3.96	4.51	.55	14.9
February	3.86	4.39	.53	13.7
March	3.81	4 30	.50	13.0
April	3.71	4.20	.49	13.0
Average	3.80	4.36	.56	14.7

It is to be regretted that more creameries did not comply with the request to give full information pertaining to this subject, and from excuses received, the keeping of monthly records is greatly neglected. It is advisable, if for no other reason than to compare the results of any creamery one year with another, that complete records of their entire business should be kept. Since the new law requires creamery managers to make reports to the dairy commissioner annually upon blanks furnished, unless records are properly kept this feature cannot be complied with. Following is the compilation by counties.

TABLE No. 8.

Separator creameries—per cent of butter fat in milk—compiled by counties, showing the average per cent of butter fat in milk for each month and the average for the twelve months ending May 1, 1897, in the different counties, together with the total average per cent for 130 creameries reported, and for each month and for the entire year.

COUNTIES.	No. creameries reporting.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	Average.
The state	130	3.53	3.53	3.62	3.70	3.87	3.94	4.07	4.01	3.96	3.86	3.81	3.71	3.80
Allamakee	2	3.57	3.32	3.55	3.65	4.06	3.99	4.22	3.98	3.99	3.76	3.69	3.61	3.78
Benton	3	3.14	3.34	3.39	3.45	4.69	3.89	4.03	3.73	3.92	3.97	3.91	3.60	3.67
Black Hawk	6	3.62	3.64	3.70	3.78	3.82	3.95	4.07	4.10	3.96	3.76	3.79	3.73	3.86
Bremer	3	3.51	3.53	3.27	3.88	3.81	3.98	4.13	3.97	3.88	3.77	3.76	3.68	3.75
Buchanan	4	3.40	3.47	3.61	3.60	3.79	3.85	4.05	4.04	3.89	3.78	3.69	3.62	3.73
Buena Vista	2	3.68	3.69	3.76	3.72	3.97	4.05	4.23	3.94	3.95	3.84	3.86	3.87	3.88
Butler	4	3.69	3.62	3.73	3.83	3.97	4.02	4.17	4.00	3.93	3.82	3.90	3.81	3.87
Calhoun	1	3.60	3.00	3.80	3.90	4.05	4.05	4.10	4.00	4.00	4.00	4.00	3.90	3.85
Carroll	5	3.72	3.54	3.70	3.86	3.88	4.00	4.12	4.06	3.98	4.04	3.98	3.75	3.89
Cerro Gordo	1	3.74	3.61	3.68	3.71	4.00	4.15	4.27	4.13	3.99	3.87	3.76	3.83	3.89
Chickasaw	6	3.65	3.52	3.57	3.66	3.82	3.90	4.19	3.94	3.94	3.74	3.73	3.68	3.77
Clarke	1	3.40	3.50	3.70	3.70	3.80	3.80	3.90	3.90	4.20	4.20	4.20	3.50	3.81
Clayton	4	3.62	3.58	3.69	3.76	3.94	4.04	4.11	4.11	4.01	3.92	3.88	3.80	3.77
Delaware	5	3.55	3.53	3.70	3.72	3.93	4.07	4.23	4.10	4.01	3.89	3.71	3.61	3.82
Dubuque	5	3.50	3.51	3.63	3.70	3.88	4.04	4.18	4.22	4.11	3.85	3.73	3.58	3.86
Emmet	1	3.40	3.53	3.70	3.73	4.00	4.00	4.10	3.80	3.70	3.74	3.78	3.70	3.77
Fayette	8	3.60	3.57	3.60	3.71	3.78	3.94	4.01	4.17	3.98	3.81	3.69	3.64	3.79
Floyd	1	3.50	3.40	3.50	3.60	3.60	3.70	3.70	4.00	4.20	4.00	4.00	4.00	3.75
Franklin	2	3.42	3.39	3.41	3.45	3.51	3.52	3.49	3.62	3.73	3.62	3.59	3.56	3.60
Greene	1	3.57	3.53	3.60	3.78	3.93	4.00	4.05	4.08	4.13	4.05	4.03	3.96	3.89
Grundy	3	3.60	3.58	3.71	3.79	3.81	3.88	3.90	3.91	3.91	3.81	3.78	3.80	3.79
Guthrie	1	3.30	3.30	3.40	3.50	3.70	3.90	4.10	4.30	4.00	3.80	3.60	3.40	3.70
Hamilton	2	3.60	3.55	3.65	3.80	3.95	4.20	4.35	4.00	4.65	4.10	3.85	3.85	3.88
Hardin	2	3.54	3.42	3.68	3.78	4.00	4.18	4.30	3.95	4.02	3.80	3.76	3.72	3.84
Henry	1	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60	3.60
Humboldt	3	3.66	3.61	3.69	3.68	3.85	4.00	4.14	3.86	3.81	3.75	3.76	3.72	3.79
Jackson	2	3.75	3.70	3.70	3.80	3.85	4.02	4.12	4.12	4.16	4.21	3.97	3.82	3.94
Jasper	1	3.60	3.50	3.59	3.69	3.67	3.85	3.95	3.90	3.85	3.80	3.80	3.87	3.75
Jefferson	4	3.33	3.38	3.48	3.65	3.70	3.73	4.06	4.12	4.10	4.05	4.75	3.81	3.76
Johnson	1	4.00	4.00	3.90	3.90	4.00	4.00	4.10	4.10	4.15	4.15	4.10	4.00	4.03
Jones	7	3.48	3.46	3.72	3.50	3.89	3.97	4.17	4.10	3.99	3.84	3.72	3.65	3.73
Kossuth	4	3.58	3.57	3.59	3.41	3.78	3.83	3.67	3.58	3.51	3.71	3.70	3.62	3.63
Linn	4	3.46	3.50	3.48	3.55	3.56	3.83	4.01	4.00	3.90	3.70	3.61	3.55	3.67
Lucas	1	3.45	3.40	3.45	3.70	3.82	4.10	4.90	4.35	4.25	4.00	3.90	3.65	3.91
Marshall	2	3.71	3.64	3.68	3.75	3.79	3.80	3.85	3.91	3.91	3.88	3.80	3.79	3.73
Palo Alto	7	3.50	3.47	3.51	3.75	3.92	3.99	3.92	3.93	3.90	3.63	3.74	3.69	3.74
Plymouth	1	3.77	3.74	3.75	3.99	4.03	4.05	4.05	4.07	4.01	4.01	4.00	3.57	3.90
Polk	1	3.40	3.40	3.50	3.67	3.70	3.80	3.90	3.85	3.80	3.80	3.70	3.60	3.67
Pottawattamie	2	3.47	3.53	3.61	3.74	4.02	4.33	4.40	4.44	4.22	4.23	3.94	3.84	3.99
Sac	2	3.88	3.73	3.83	3.95	4.00	3.93	4.04	3.98	3.98	3.85	3.94	3.90	3.91
Shelby	1	3.40	3.30	3.30	3.50	3.60	3.60	3.80	3.80	3.80	3.80	3.70	3.60	3.69
Sioux	1	3.66	3.63	3.67	3.78	3.89	4.22	4.26	4.28	4.20	4.00	3.72	3.56	3.90
Story	4	3.49	3.47	3.56	3.57	3.77	3.86	4.08	3.98	4.30	3.88	3.78	3.70	3.73
Union	1	3.70	3.60	3.70	3.80	4.00	4.20	4.20	4.30	4.10	4.20	4.10	4.10	4.09
Washington	1	3.30	3.30	3.40	3.55	3.80	3.90	4.02	4.20	4.01	4.00	3.70	3.80	3.66
Winnebago	2	3.54	3.62	3.63	3.70	3.97	4.06	4.10	4.00	3.77	3.71	3.71	3.78	3.79
Winneshiek	1	3.60	3.70	3.70	3.90	4.40	4.30	4.00	4.00	4.00	4.00	3.90	3.90	3.95
Worth	2	3.55	3.60	3.65	3.70	3.80	3.95	4.00	3.80	3.75	3.68	3.63	3.51	3.72
Wright	1	3.70	3.70	3.80	3.90	3.95	4.00	4.00	4.00	3.95	3.90	3.85	3.80	3.71
Average	130	3.53	3.53	3.62	3.70	3.87	3.94	4.07	4.01	3.96	3.86	3.81	3.71	3.80

TABLE No. 9.

Separator creameries—per cent of butter—compiled by counties, showing the average per cent of butter or churn yield for each month, and the average for the twelve months ending May 1, 1897, in the different counties, together with the total average per cent for 118 creameries reported, and for each month, and for the entire year.

COUNTIES.	No. creameries reporting.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	Average.
The state	118	4.08	4.04	4.16	4.26	4.45	4.55	4.76	4.62	4.51	4.39	4.31	4.20	4.36
Adair	1	4.13	4.12	4.18	4.31	4.51	4.80	4.88	4.80	4.90	4.85	4.14	4.25	4.48
Allamakee	2	4.10	4.05	4.05	4.50	4.66	4.71	4.80	4.05	4.53	4.24	4.13	4.08	4.49
Benton	1	4.20	4.00	4.10	4.50	4.00	4.12	4.50	4.25	4.00	4.00	4.00	4.00	4.13
Black Hawk	9	4.03	4.07	4.13	4.29	4.36	4.42	4.61	4.52	4.45	4.19	4.19	4.19	4.28
Bremer	9	4.07	4.12	4.23	4.34	4.73	4.65	4.89	4.71	4.55	4.45	4.38	4.2	4.44
Buchanan	3	3.95	4.01	4.16	4.14	4.43	4.62	4.97	4.60	4.46	4.20	4.14	3.99	4.30
Buena Vista	1	4.06	4.07	4.00	4.09	4.26	4.36	4.76	4.40	4.35	4.22	4.21	4.39	4.26
Butler	2	4.21	3.96	4.44	4.46	4.48	4.58	4.72	4.48	4.60	4.55	4.39	4.59	4.37
Calhoun	1	3.80	3.80	4.01	4.05	4.30	4.22	4.20	4.20	4.15	4.15	4.15	4. 0	4.09
Carroll	3	4.06	3.70	3.86	4.03	4.20	4.23	4.33	4.33	4.43	4.43	4.40	4.20	4.18
Cedar	1	4.20	3.90	3.90	4.01	4.20	4.40	4.40	4.30	4.20	4.20	4.25	4.20	4.18
Chickasaw	3	4.15	4.04	4.02	4.02	4.37	4.36	4.54	4.36	4.36	4.26	4.10	3.96	4.21
Clarke	1	4.00	4.20	4.50	4.50	4.60	4.60	4.70	4.70	5.00	5.00	5.00	4.04	4.57
Clay	1	4.31	4.25	4.38	4.59	4.70	4.80	4.90	4.80	4.60	4.60	4.50	4.10	4.53
Clayton	5	4.08	4.10	4.20	4.26	4.52	4.61	4.71	4.72	4.53	4.28	4.16	4.27	4.37
Dallas	1	3.70	3.80	3.70	3.70	4.00	4.10	4.30	4.50	4.30	4.10	3.90	4.05	4.01
Delaware	6	4.01	4.03	4.17	4.27	4.38	4.53	4.79	4.53	4.66	4.61	4.52	4.35	4.40
Dubuque	9	3.98	3.87	4.10	4.27	4.37	4.44	4.58	4.50	4.24	4.11	3.99	3.90	4.19
Emmet	1	4.36	4.33	4.35	4.48	4.70	4.58	4.79	4.33	4.53	4.64	4.44	4.59	4.51
Fayette	4	4.11	4.16	4.27	4.28	4.56	4.69	4.85	4.62	4.55	4.46	4.23	4.08	4.40
Floyd	1	4.30	4.27	4.40	4.50	4.8	4.7	4.70	5.00	5.10	5.00	5.00	5.00	4.72
Franklin	2	4.02	3.94	4.07	4.12	4.30	4.19	4.27	4.27	4.18	4.04	4.07	3.56	4.08
Greene	1	3.89	3.84	3.98	4.24	4.29	4.40	4.65	4.48	4.61	4.50	4.42	4.15	4.32
Grundy	1	4.12	3.92	4.28	4.16	4.21	4.35	4.45	4.34	4.10	4.24	4.33	4.38	4.28
Hamilton	1	4.40	4.00	4.25	4.20	4.50	4.66	5.00	4.75	4.25	4.50	4.75	4.20	4.45
Humboldt	1	4.26	4.10	4.10	4.26	4.60	4.60	4.65	4.34	4.40	4.25	4.33	4.05	4.33
Jackson	1	3.66	3.90	3.60	3.98	4.00	4.20	4.25	4.15	4.16	4.12	3.70	4.05	3.98
Jefferson	2	3.90	3.97	4.00	4.10	4.25	4.42	4.70	4.80	4.75	4.72	4.30	4.05	4.33
Johnson	1	4.25	4.20	4.10	4.10	4.15	4.20	4.30	4.35	4.40	4.30	4.30	4.25	4.24
Jones	6	3.91	3.88	3.95	4.08	4.28	4.47	4.78	4.62	4.49	4.19	4.16	4.09	4.23
Keokuk	2	2.94	3.90	3.95	4.00	4.32	4.62	4.90	5.00	4.95	4.75	4.60	4.00	4.41
Kossuth	4	4.27	4.30	4.31	4.33	4.47	4.84	5.91	4.82	4.65	4.45	4.47	4.28	4.51
Linn	6	3.81	3.87	3.93	4.03	4.08	4.26	4.40	4.43	4.25	4.09	3.99	3.95	4.09
Lucas	1	4.06	4.05	4.70	4.32	4.45	4.70	5.50	4.95	4.94	4.80	4.65	4.35	4.62
Palo Alto	7	4.37	4.31	4.41	4.48	4.83	4.95	5.08	4.79	4.75	4.57	4.58	4.70	4.63
Pocahontas	1	4.30	4.30	4.35	4.50	4.90	4.85	4.90	4.50	4.50	4.35	4.25	4.30	4.50
Polk	1	4.00	4.04	4.08	4.21	4.35	4.40	4.60	4.55	4.50	4.30	4.15	4.16	4.29
Pottawattamie	1	3.30	3.60	3.80	4.40	4.70	4.70	4.70	4.50	4.40	4.30	4.20	4.21	4.23
Sac	2	4.20	4.13	4.18	4.27	4.47	4.44	4.51	4.43	4.53	4.48	4.44	4.27	4.36
Shelby	2	4.20	3.75	4.10	4.20	4.30	4.35	4.45	4.45	4.45	4.45	4.35	4.30	4.27
Sioux	1	4.51	4.40	4.56	4.82	4.91	4.83	5.04	5.22	5.12	4.80	4.71	4.56	4.79
Story	2	4.05	4.07	4.20	4.07	4.24	4.29	4.65	4.65	4.75	4.49	4.38	4.25	4.34
Union	1	4.19	4.13	4.67	4.21	4.41	4.92	4.25	4.91	4.82	4.77	4.31	4.20	4.56
Washington	1	3.95	3.97	4.05	4.20	4.60	4.70	5.00	5.12	4.00	4.70	4.80	4.00	4.42
Wayne	1	4.16	4.08	4.15	4.50	4.62	4.81	4.24	5.09	5.01	4.81	4.69	4.36	4.54
Winnebago	1	4.02	4.04	4.11	4.39	4.72	4.94	5.16	4.97	4.64	4.40	4.30	4.20	4.49
Worth	3	4.54	4.48	4.62	4.66	4.77	5.00	5.15	5.00	4.83	4.72	4.70	4.59	4.70
	118	4.08	4.04	4.16	4.26	4.45	4.55	4.76	4.62	4.51	4.39	4.31	4.20	4.36

RAILWAY BUTTER SHIPMENTS.

For a number of years the annual reports of this department have contained tables compiled by counties, showing the gross shipments of butter originating in Iowa, and consigned to markets outside of the state. This information is of the most reliable character and is furnished the dairy commissioner upon application, by the proper officials of all the railways operating in the state. From no other source can the condition of the dairy industry be better shown than through a comparison of the shipments from year to year, together with the increase or decrease in the number of creameries in operation during the respective periods. Following is a table showing the shipments of butter from Iowa during the year ending September 30, 1897, together with a comparison of shipments of the previous year, with the increase or decrease by counties, and the number of creameries in operation for the two years and their increase or decrease by counties:

TABLE No. 10.

Butter shipments—Iowa railway shipments compiled by counties.

COUNTIES.	NUMBER OF CREAMERIES FOR YEARS 1896 AND 1897, SHOWING INCREASE OR DECREASE BY COUNTIES.				GROSS POUNDS OF BUTTER SHIPPED OUT OF THE STATE FOR THE YEARS ENDING SEPTEMBER 30, 1896, AND 1897, SHOWING INCREASE OR DECREASE BY COUNTIES.			
	1896.	1897.	Increase.	Decrease.	1896.	1897.	Increase.	Decrease.
The state	810	891	123	43	95,267,243	99,547,684	*9,493,692	5,213,251
Adair	6	9	3	....	406,075	485,858	79,783	....
Adams	5	8	3	....	477,317	716,926	239,609	....
Allamakee	13	9	....	4	1,281,925	1,610,804	328,879	....
Appanoose	....	....	....	....	....	....	....	....
Audubon	5	6	1	....	666,125	932,502	266,377	....
Benton	11	12	1	....	560,225	747,455	187,230	....
Black Hawk	22	19	....	3	2,524,553	2,436,560	....	87,993
Boone	4	7	3	....	247,610	190,897	....	56,713
Bremer	25	24	....	1	3,379,179	3,284,299	....	94,880
Buchanan	17	15	....	2	3,883,216	3,742,614	....	140,602
Buena Vista	9	10	1	....	1,162,147	1,531,062	368,915	....
Butler	18	21	3	....	2,988.122	3,397,313	409,191	....
Calhoun	7	7	....	....	1,033,209	1,064,677	31,468	....
Carroll	8	12	4	....	989,853	1,065,768	75,915	....
Cass	5	7	2	....	253,416	348,507	95,091	....
Cedar	6	11	5	....	1,116,959	1,013,450	....	103,509
Cerro Gordo	10	11	1	....	1,266,931	1,710,620	443,689	....
Cherokee	6	7	1	....	461,534	621,394	159,860	....
Chickasaw	19	20	1	....	3,071,315	3,469,397	398,082	....
Clarke	4	4	....	....	99,856	336,468	236,612	....
Clay	6	9	3	....	1,081,978	596,047	....	485,931
Clayton	20	21	1	....	3,296,653	3,461,667	165,014	....
Clinton	15	15	....	....	715,637	668,953	....	46,704
Crawford	6	8	2	....	284,829	358,380	73,551	....
Dallas	6	6	....	....	1,161,495	986,285	....	175,210
Davis	3	3	....	....	175,105	86,689	....	88,416
Decatur	....	2	2	....	14,919	14,170	....	749
Delaware	27	27	....	....	3,501,992	3,285,556	....	216,436
Des Moines	....	....	....	....	82,098	187,243	105,145	....
Dickinson	2	3	1	....	339,755	527,805	188,050	....
Dubuque	26	26	....	....	3,213,973	2,836,116	....	377,857
Emmet	5	4	....	1	402,300	586,995	184,695	....
Fayette	24	23	....	1	3,545,578	3,379,338	....	166,240
Floyd	8	6	....	2	915,385	614,112	....	301,273
Franklin	9	11	2	....	719,271	733,530	14,259	....
Fremont	....	....	....	....	1,076	2,895	1,819	....
Greene	6	9	3	....	1,357,264	1,473,100	115,836	....
Grundy	16	18	2	....	1,407,680	1,410,605	2,925	....
Guthrie	6	11	5	....	378,112	464,226	86,114	....
Hamilton	6	10	4	....	2,048,991	2,074,264	25,273	....
Hancock	12	8	....	4	325,428	322 698	....	2,730
Hardin	9	12	3	....	1,670,994	1,752,701	81,707	....
Harrison	2	7	5	....	33,410	176,040	142,630	....
Henry	2	3	1	....	72,747	82,445	9,698	....
Howard	6	7	1	....	1,741,111	1,760,095	18,984	....
Humboldt	7	10	3	....	991,451	994,020	2,569	....
Ida	5	5	....	....	231,760	462,376	230,616	....
Iowa	5	6	1	....	630,642	795,903	165,261	....
Jackson	17	18	1	....	1,021,326	1,063,277	41,951	....
Jasper	10	11	1	....	673,190	785,782	112,592	....
Jefferson	7	10	3	....	381,562	522,613	141,051	....
Johnson	6	9	3	....	246,960	163,020	....	83,960
Jones	29	26	....	3	3,102,590	3,171,202	68,612	....
Keokuk	5	5	....	....	484,109	345,895	....	138,214
Kossuth	19	20	1	....	2,176,268	2,518,619	342,351	....
Lee	2	2	....	....	1,036,100	453,790	....	582,310
Linn	28	28	....	....	2,472,643	2,208,247	....	264,396
Louisa	3	3	....	....	83,970	118,975	35,005	....
Lucas	2	1	....	1	126,775	73,310	....	53,465
Lyon	3	3	....	....	257,320	280,562	23,242	....
Madison	5	4	....	1	198,995	108,856	....	90,139
Mahaska	2	1	....	1	226,900	253,225	26,325	....

TABLE No. 10—CONTINUED.

COUNTIES.	NUMBER OF CREAMERIES FOR YEARS 1896 AND 1897, SHOWING INCREASE OR DECREASE BY COUNTIES.				GROSS POUNDS OF BUTTER SHIPPED OUT OF THE STATE FOR THE YEARS ENDING SEPTEMBER 30, 1896 AND 1897, SHOWING INCREASE OR DECREASE BY COUNTIES.			
	1896.	1897.	Increase.	Decrease.	1896.	1897.	Increase.	Decrease.
Marion	4	5	1	...	296,384	225,689	....	70,695
Marshall	8	7	..	1	990,217	915,679	....	74,538
Mills	3	3	..	....	147,795	84,835	....	62,960
Mitchell	10	8	.	2	1,795,350	2,100.805	305,455	....
Monona	1	2	1	....	28,880	53.997	25,117	....
Monroe	....	1	1	....	4.175	18,785	14 610	....
Montgomery	2	2	..	....	244,133	329,697	85,564	....
Muscatine	6	6	..	...	475.215	393,420	....	81,795
O'Brien	2	4	2	...	672,100	431,060	....	241,040
Osceola	2	4	2	....	57,015	104.120	47.105	....
Page	8	7	4	....	204,849	297.898	93,049	....
Palo Alto	17	16	....	1	2,159,118	1,899,239	....	259,879
Plymouth	7	10	3	...	835 475	949,315	113,840	....
Pocahontas	5	9	4	..	896,209	859,171	....	37,038
Polk	6	6	...	...	220,515	241,425	20,910	....
Pottawattamie	5	5	....	....	673,603	750,522	76,919	....
Poweshiek	6	6	....	...	399,566	500,688	101,122	....
Ringgold	3	4	1	....	101,359	103,225	1,866	....
Sac	14	14	....	....	1,424.833	1,441,747	16,914	....
Scott	3	4	1	...	128 273	126,404	....	1,869
Shelby	4	6	2	...	204,808	330,559	125,751	....
Sioux	9	9	..	..	914,991	1,021,182	106,191	....
Story	14	16	2	...	1,257,115	2,422,437	1,165,322	....
Tama	6	8	2	....	609,285	685.450	76,165	....
Taylor	6	8	2	..	100,428	255,241	154,813	....
Union	10	13	3	....	982,463	1,390,809	408,346	....
Van Buren	2	3	1	....	35,785	75,476	39,691	....
Wapello	5	5	....	....	1,404,098	1,009.110	.....	394,988
Warren	3	4	1	...	55,840	131.300	75,460	....
Washington	7	5	....	2	667,180	662,765	....	4,415
Wayne	6	6	....	...	767,494	313,542	....	453,952
Webster	7	6	..	1	908,004	912,137	4,133	....
Winnebago	14	12	..	2	1,070,980	1,199.976	128,996	....
Winneshiek	21	12		9	2,032,786	2,091,505	58,719	....
Woodbury	...	6	6	....	1,864,856	1,970,014	105,163	.....
Worth	8	10	2	..	1,084,642	1,062,257	....	22,385
Wright	4	9	5	...	851,500	1,267,995	416,495	......
Total	810	891	123	42	95,267,243	99,547,684	*9,493,692	5,213,251

*Net increase for year, 4,280 44 pounds.

The above table shows the number of creameries and skim stations to be 891, a net increase over 1896, of 81 creameries. This net increase is made up of an increase of 123 plants in 54 counties, and a decrease of 42 plants in 19 counties. The largest increase made in any one county is that of Woodbury, which in 1896 had none, and now has 6. There is an increase of 5 in each of the following counties: Cedar, Guthrie, Harrison and Wright. Carroll, Page and Pocahontas each have 4 added to their list. Those having the largest decrease are Winneshiek, 9, and Allamakee and Hancock, 4 each. The total gross pounds of butter billed out of the state for the year ending September 30, 1897, was 99,547,684, a net increase over the shipments of 1896, for a corresponding period, of 4,280,441 pounds. Sixty-five counties show an increase of 9,493,692 pounds, and 33 counties a decrease of 5,213,251 pounds. Appanoose county had no shipments during either year. Of the 65 counties having an increase, Story county has the largest, being 1,165,322 pounds. The next largest is Cerro Gordo, with 443,389 pounds. The largest decrease is made in Lee county, which was 582,310 pounds. Clay county shows 485,931 pounds and Wayne county, 453,952 pounds decrease. In the last three counties large quantities of dairy and store butter have been reworked and packed heretofore, and the discontinuing of this to a greater or less extent, may account for the large decrease. Deducting 16 per cent for weight of package, for the gross shipments of 1897, leaves 83,620,081 as the net pounds of butter shipped. The net pounds shipped in 1890 was 71,255,796, and there was a gradual decrease until 1894, when the shipments were but 54,509,417, a decrease of 16,746,379 pounds. This was during the time that the traffic in oleomargarine had practically full sway in most of the leading markets of our country. The increase since 1894 is 29,110,664 net pounds of butter, or 53 per cent.

The largest increase was made during 1896. The favorable conditions for the production of butter, throughout the year, placed the market so high in the quantity shipped, that an increase was not to be expected for a corresponding period, for some time to come. It is now found, however, notwithstanding the partial drouth of the past season and the unfavorable spring months, there has been an increase of 3,587,165 pounds of butter over and above that of 1896. There are now 981 creameries in the state, the largest number that has ever been in operation. This, together with the increase above referred to, warrants the conclusion that our dairy interests are in the best and most prosperous condition yet attained, and a larger number of our citizens are now engaged in this industry, than at any previous time in the history of Iowa. This branch of agriculture is a direct resource to our state, for when we realize that our people receive annually approximately $15,000,000 for butter shipments to markets outside of the state, and in this transaction the fertility of the soil is in no way affected—unless it may be said that an improvement takes place,—its importance must be apparent to all, and the industry admitted to be second to none. Information similar to that embodied in Table No. 17 was first compiled and published in the tenth annual report of this department. Table No. 11, in this report, contains information of a like nature, for the year ending September 30, 1897. From this table correct comparisons of butter shipments can be made, one county with another, upon the most equitable basis. The rank of each county upon the basis of total net shipments, and the shipments per square mile is both interesting and instructive. Following is the table:

TABLE No. 11.

NET POUNDS OF BUTTER SHIPPED—COMPILED BY COUNTIES.

Showing total net shipments of butter from each county, and rank; area of each county; pounds per square mile for each county, and rank; also total shipments for the state, with net pounds per square mile, for the year ending September 30, 1897.

COUNTIES.	Total net shipments of butter for the year.	Rank by total lbs. shipped.	Area of square miles in counties.	Pounds per square mile.	Rank by lbs. per square mile.
The state	83,620,081		56,025	*1,492	......
Adair	408,121	60	776	526	67
Adams	602,218	49	432	1,394	39
Allamakee	1,353,075	22	658	2,055	29
Appanoose	....	....	516	.....	99
Audubon	783,302	40	443	1,768	33
Benton	627,862	47	720	872	55
Black Hawk	2,088,710	11	576	3,626	11
Boone	160,353	80	576	278	81
Bremer	2,758,811	7	432	6,386	1
Buchanan	3,143,796	1	576	5,458	3
Buena Vista	1,286,092	23	576	2,233	24
Butler	2,853,743	4	576	4,954	4
Calhoun	894,329	31	576	1,553	35
Carroll	895,245	30	576	1,554	34
Cass	292,746	67	576	508	68
Cedar	851,298	35	576	1,478	36
Cerro Gordo	1,436,921	21	576	2,496	22
Cherokee	521,971	53	576	906	52
Chickasaw	2,914,293	2	504	5,790	2
Clarke	282,633	69	432	654	64
Clay	500,679	55	576	869	56
Clayton	2,907,800	3	728	3,994	7
Clinton	561,904	51	698	805	57
Crawford	301,059	66	720	418	74
Dallas	828,479	38	588	1,409	37
Davis	72,817	90	502	145	92
Decatur	11,908	87	534	22	97
Delaware	2,759,867	6	576	4,791	5
Des Moines	157,284	81	415	379	77
Dickinson	443,356	57	404	1,097	45
Dubuque	2,382,337	9	601	3,967	8
Emmet	493,075	56	404	1,221	42
Fayette	2,838,644	5	720	3,943	9
Floyd	515,854	54	504	1,022	48
Franklin	616,165	48	576	1,070	46
Fremont	2,432	98	509	5	98
Greene	1,237,404	24	576	2,152	27
Grundy	1,184,908	26	504	2,351	28
Guthrie	389,950	61	593	658	63
Hamilton	1,742,388	16	576	3,025	14

TABLE No. 11—CONTINUED.

COUNTIES.	Total net shipments of butter for the year.	Rank by total lbs shipp'd.	Area of square miles in counties.	Pounds per square mile.	Rank by lbs. per square mile.
Hancock	271,066	72	576	471	72
Hardin	1,472,269	20	576	2,556	19
Harrison	147 874	82	696	213	86
Henry	69,254	92	433	159	91
Howard	1,478,480	19	476	3,104	13
Humboldt	834,977	37	432	1,933	31
Ida	388 396	62	433	897	54
Iowa	668,559	44	584	1.144	43
Jackson	893,153	32	638	1,400	38
Jasper	660,057	45	730	904	53
Jefferson	438,995	58	432	1.016	49
Johnson	136,937	83	618	222	84
Jones	2,663,310	8	576	4,624	6
Keokuk	290,552	68	576	504	69
Kossuth	2,115,640	10	977	2,165	28
Lee	381,184	63	512	744	60
Linn	1,854,927	13	720	2,576	18
Louisa	99,939	86	407	245	82
Lucas	61,606	94	432	143	93
Lyon	235,672	75	587	401	75
Madison	91,439	87	576	159	90
Mahaska	212,709	77	576	369	78
Marion	189,579	79	576	329	80
Marshall	769,171	41	576	1,335	40
Mills	71,262	91	444	160	88
Mitchell	1,764,676	14	473	3,730	10
Monona	45,357	95	556	81	95
Monroe	15,779	96	432	36	96
Montgomery	276,945	71	432	641	65
Muscatine	330,473	65	437	756	59
O'Brien	362,090	64	576	629	66
Osceola	87,460	88	400	2 9	85
Page	250,234	74	557	450	73
Palo Alto	1,595,360	18	576	2,770	16
Plymouth	797,425	39	860	927	51
Pocahontas	721,704	43	576	1,253	41
Polk	202,797	78	585	345	79
Pottawattamie	630,438	46	960	657	63
Poweshiek	4 0,578	58	382	723	61
Ringgold	86.709	89	542	160	89
Sac	1,211,067	25	576	2,102	28
Scott	106,179	85	455	234	83
Shelby	277,670	70	590	471	71
Sioux	857,793	34	769	1,115	44
Story	2,034,847	12	576	3,532	12
Tama	575,778	50	720	800	58
Taylor	214,402	76	548	392	76
Union	1,168,280	27	432	2,704	17
Van Buren	63,400	93	484	131	94
Wapello	847,652	36	432	1,962	30
Warren	110,292	84	569	194	87
Washington	556,723	52	566	983	50
Wayne	263.375	84	523	503	70
Webster	766,195	42	720	1,064	47
Winnebago	1,007,960	29	403	2,501	21
Winneshiek	1,756,864	15	694	2,531	20
Woodbury	1,654,812	17	873	3,891	15
Worth	892.296	33	402	2,219	25
Wright	1,065,116	28	576	1,849	32
Total	83,620,081		56.025	*1.492	......

*Plus.

From this table there will be found a change in the relative positions of many of the counties as regards the total shipments per square mile, when compared with Table No. 17, in the tenth annual report. Those counties shipping 3,000 or more pounds per square mile, are here given according to the rank in shipments per square mile, together with the total number of pounds shipped, and the total number of pounds per square mile:

Rank.	COUNTY.	Total pounds shipped.	Pounds per sq. mile.
1	Bremer	2,758,811	6,386
2	Chickasaw	2,914,293	5.790
3	Buchanan	3,143,796	5,458
4	Butler	2,853,743	4,954
5	Delaware	2,853,743	4,791
6	Jones	2,663,810	4,624
7	Clayton	2,907,800	3,994
8	Dubuque	2,382,337	3,967
9	Fayette	2,838,644	3,943
10	Mitchell	1,764,676	3 730
11	Black Hawk	2,088,710	3,626
12	Story	2,054,847	3,532
13	Howard	1,478,480	3,104
14	Hamilton	1,742,382	3,025

In this list, Bremer county still heads the list with 6,386 net pounds shipped per square mile of territory within its borders, which will amount to over $1,000 annually. Chickasaw county has succeeded Buchanan in second place, still when the total pounds of butter shipped is considered, Buchanan with 3,143,796 net pounds still holds the lead in this respect, and received at a fair estimate $550,000 for the butter shipments during the past year. Palo Alto county has dropped from the list of those having 3,000 or more pounds per square mile, and Story, with 3,532 pounds per square mile, and Hamilton, 3,025 pounds have advanced to this class.

From Table No. 11, we find that the average net shipments of butter per county was 844,647 pounds, an increase over the previous year of 46,335 pounds, and also that the average pounds per square mile was 1,492, an increase of 64 pounds over that of the previous year.

IOWA CREAMERY LIST.

List of creameries in the state, alphabetically arranged according to counties and towns near where creamery is located, together with information pertaining to each.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number
	Adair County									
1	Adair.	sElgin Creamery Co.	Ind.	O. Sands, Pres.	Chicago, Ill.	Adair.		Sep'tr	Test.	
2	Arbor Hill.	sArbor Hill Creamery	Ind.	E. M. Lamos.	Stuart.	Stuart.		Sep'tr	Test.	
3	Canby	sCanby Creamery	Ind.	A. L. Stewart.	Fontanelle.	Fontanelle		Sep'tr	Hd.	
4	Fisk	sFisk Creamery	Ind.	A. L. Stewart	Fontanelle.	Fontanelle		Sep'tr	Hd.	
5	Fontanelle	Blue Grass Cr'y Co.	Ind.	A. L. Stewart.	Fontanelle.	Fontanelle	W. F. Stewart	Sep'tr	Hd.	
6	Greenfield.	Greenfield Creamery	Ind.	J. A. Darby	Greenfield.	Greenfield.	J. O. Sanders	Sep'tr	Hd.	
7	Holiday	sElgin Creamery Co	Ind.	O. Sands, Pres.	Chicago, Ill.	Creston.		Sep'tr	Test.	
8	North Adair.	sElgin Creamery Co.	Ind.	O. Sands, Pres.	Chicago, Ill.	Atlantic		Sep'tr.	Test.	
9	Orient.	sElgin Creamery Co.	Ind	O. Sands, Pres.	Chicago, Ill.	Creston.		Sep'tr	Test.	
	Adams County.									
10	Corning.	Elgin Creamery Co.	Ind.	O. Sands, Pres.	Chicago, Ill	Corning.	Chas. Johnson	Sep'tr	Test.	
11	Carbon.	sElgin Creamery Co	Ind.	O. Sands, Pres.	Chicago, Ill.			Sep'tr	Test.	193
12	Carl.	sElgin Creamery Co	Ind.	O. Sands, Pres.	Chicago, Ill			Sep'tr	Test,	
13	Iveyville	Farmers' Creamery	Co-op.	H. B. Moles, Sec.	Guss	Corning.	W. Lebhart	Sep'tr	Test.	177
14	Mercer.	sElgin Creamery Co.	Ind.	O. Sands, Pres.	Chicago, Ill.			Sep'tr	Test	
15	Nodaway	sElgin Creamery Co	Ind.	O. Sands, Pres.	Chicago, Ill.			Sep'tr	Test.	

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sSkim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number
	Adams County—Continued									
16	Prescott......	Prescott B. & C Assn..	Ind...	F. Brandt, Sec......	Prescott. ...	Prescott.......	Chas. E. Chawgo	Sep'tr..	Test.	
17	Williamson....	Prescott B. & C. Assn..	Ind...	F. Brandt, Sec......	Prescott......	Prescott.......	....	Sep'tr..	Test.	
	Allamakee County.									
18	Dorchester....	Dorchester Creamery..	Ind...	L. Coppersmith, Sec.	Dorchester. ..	New Albany...	H. J. Foss.......	G. C.		
19	Lansing	Calhoun Creamery.....	Co-op.	F. Stirn, Pres........	Lansing..	Lansing...	Geo. Turner.....	G. C.		
20	Postville.......	Postville Farmers' Co-operative Creamery..	Co-op.	Ellison Orr..........	Postville.......	Postville.......	J. A. Gordon....	Sep'tr..	Test..	70
21	Quandahl......	Arctic Spring Creamery	Ind...	J. D. Johnson........	Quandahl......	Spring Grove..	J H. Gaare.....	G. C.		
22	Rossville	Farmers' Co-op. Cr'y Co.	Co-op.	E. W. Stanley, Sec..	Rossville......	Rossville......	C. N. Hart. ..	Sep'tr..	Test.	
23	Village Creek..	Village Creek Cr'y Co..	Co-op	F. W. Brennan, Pres.	Village Creek.	Lansing........	K. Munson	Sep'tr..	Test.	
24	Waterville...	Farmers' Co-operative and Commercial Cr'y.	Co-op.	A. Asleson, Sec......	Waterville.....	Waterville.....	A. Asleson......	G. C.		
25	Waukon.......	Farmers' Waukon Co-operative Creamery..	Co-op	M. Kelly, Pres.......	Waukon..	Waukon. .	Jackson Smith..	[G. C. Sep'tr &	Test..	1,060
26	Waukon.......	Ludlow Co-op. Cr'y Co.	Co-op	A. G. Winter, Sec....	Waukon..	Waukon.......	F. A. Flet	Sep'tr..	Test..	175
	Audubon County.									
27	Audubon.....	Sharon Creamery.......	Co-op.	B. Jensen, Sec........	Audubon......	Audubon.....	B. Jensen.......	Sep'tr..	Test.	
28	Brayton..	Oakfield Sep'tr Cr'y Co.	Co-op.	J. Nymand, Sec......	Brayton........	Brayton.	H. Henrickson..	Sep'tr..	Test.	
29	Exira..........	West Hamlin Separator Creamery Co.........	Co-op.	Hans Peterson.	Exira..........	Exira..........	H. Peterson. ...	Sep'tr..	Test.	

30	Exira........	sElgin Creamery Co....	Ind...	O. Sands, Pres.......	Chicago, Ill....	Exira...........	....	Sep'tr..	Test.	
31	Hamlin........	Blue Grass Sep'tr Cr'y..	Co-op.	R. W. Mullenger....	Hamlin...... ..	Hamlin........	E Schoonow ...	Sep'tr ..	Test..	1,012
32	Kimballton ...	Danish Sep'tr Cr'y Co...	Co-op.	P. H. Ingesler.......	Kimballton...	Audubon	J. Anderson	Sep'tr.	Test.	
	Benton County.									
33	Atkins........	Fremont Creamery.....	Co-op.	George Bromlie Sec.	Atkins.........	Atkins....... .	C. P. Lake	Sep'tr.	Test.	286
34	Belle Plaine...	Springbrook	Ind. ..	John Newman	Elgin, Ill.......	Belle Plaine...	....	Sep'tr ..	Test..	
35	Blairstown ...	Katie's Creamery	Ind. .	J. A. Duncalf	Blairstown	Blairstown ...	KatieA.Duncalf	Sep'tr ..	Test..	1,069
36	Mt. Auburn ...	Mt. Auburn Cr'y Co.. ..	Co-op.	C. Morck, Sec.	Mt. Auburn...	Mt. Auburn...	C Morck.......	Sep'tr.	Test..	
37	Norway.......	Norway Creamery......	Ind. ..	Wm. Rowse	Norway	Norway........	Wm. Rowse	Sep'tr.	Test.	
38	Shellsburg	Shellsburg Creamery ..	Ind. ..	W. R. McGregor.....	Shellsburg.....	Newhall	W. R. McGregor.	S. & G.C.	Hd....	95
39	Shellsburg. ...	sLouieville	Ind. ..	W. R. McGregor.....	Shellsburg.....	Newhall	....	S & G.C.	Hd.	
40	Urbana...	Farmers' C-op Cr'y Co.	Ind. ..	A. B. Cramer........	Urbana	Center Point ..	C. M. Fisher ...	Sep'tr ..	Test..	56
41	Van Horne	Van Horne Creamery..	Ind. ..	Geo. Gardiner	Van Horne	Van Horne	....	S. & G.C	Test..	998
42	Vinton	Vinton Creamery.......	Ind. ..	A. M. Rowe..........	Vinton.........	Vinton.........	Homer Barker.	G. C.		
43	Walford	Walford Creamery	Ind. ..	H. Humphry.......	Walford .. .	Walford	....	Sep'tr.	Test.	
44	Watkins	Watkins Creamery.....	Ind. ..	E. S. McDonald	Watkins	Watkins	Proprietor	Sep'tr.	Test.	
	Black Hawk County.									
45	Benson	Benson Dairy Co.	Co-op.	Wm. Morgan, Sec...	Benson..... ...	Benson	Geo. Thayer ...	Sep'tr ..	Test..	650
46	Boise	Mt. Vernon Cr'y Co	Co-op.	J. E. Rundles, Sec...	Boise..........	Janesville	M. Johnson	Sep'tr.	Test.	
47	Cedar Falls....	Black Hawk Creamery.	Co-op.	J. C. Filkins, Sec....	Cedar Falls. ..	Cedar Falls....	J. S. Smith	Sep'tr ..	Test..	151
48	Cedar Falls....	Cedar Falls Co-op. C. C	Co-op	J. M. Helfer, Sec....	Cedar Falls ..	Cedar Falls....	A. W. Pierce....	Sep'tr ..	Hd....	660
49	DeWar	Pleasant Val. Dairy As.	Co-op.	W. F. Garrett, Sec...	DeWar.........	DeWar	W. H. Graham..	Sep'tr ..	Test..	82
50	Dunkerton .. .	Edwards Creamery... .	Ind. ..	Wm. Weddel	Edwards.......	Dunkerton	S. P. Doty......	Sep'tr ..	Test..	260
51	Dunkerton	Farmers' Creamery Co.	Co-op.	H. Hoofnagle, Pres.	Dunkerton	Dunkerton ...	O. G. Alexander	Sep'tr ..	Test..	1,002
52	Dunkerton	East Lester Creamery..	Co-op	J. C. Tribon, Sec.. .	Fairbank	Fairbank	J. F. Dietz......	Sep'tr .	Test..	271
53	Eagle Center..	Eagle Center Dairy As.	Co-op.	T. J. Humphrey, Sec	Eagle Center..	Waterloo	Josiah Hill	Sep'tr ..	Test..	322

sSkim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Black Hawk County—Continued.									
54	Finchford	Union Creamery Co	Co-op.	A. A. Briggs, Sec.	Finchford	Winslow	A. A. Briggs	Sep'tr	Test	1,001
55	Gilbertville	Gilbertville Dairy As.	Co-op.	E. Marion, Sec	Gilbertville	Washburn	I. I. Chase	Sep'tr	Test	658
56	Hudson	Rock Creek Frs. D'y As.	Co-op.	James Conry, Pres.	Hudson	Hudson	Thomas Hansen	Sep'tr	Test	1,003
57	Hudson	Hudson Co-op. D'y As.	Co-op	D. Bedford, Sec	Hudson	Hudson	J. W. Burtchett.	Sep'tr	Test	670
58	Jubilee	Co-op Cr'y Co of Jubilee	Co-op	H. G. Koob, Sec.	Jubilee	Jubilee	B. Lenires	Sep'tr	Test	325
59	La Porte. [Grundy Co.	LaPorte Co-op. Cr'y Co	Co-op.	A. K. Longaker, Pr.	LaPorte City [Grundy Co.	LaPorte City [Grundy Co	Oscar Harvey	Sep'tr	Test	343
60	Reinbeck	Red Bird Cr'y Co.	Co-op.	James Wilson, Pres.	Reinbeck	Reinbeck	S. E. Stevens	Sep'tr	Test	680
61	Waterloo	Crain Creek	Ind.	F. A. Riedel	Crain Creek	Waterloo	F. A. Riedell	Sep'tr	Hd	131
62*	Waterloo	North Star Creamery	Ind.	Fowler Co	Waterloo	Waterloo	Chas. Wood	Sep'tr.	Test.	
63*	Waterloo	Waterloo Creamery	Ind.	Fowler Co	Waterloo	Waterloo	F. Wightman	Sep'tr.	Test.	
	Boone County									
64	Beaver	Beaver Creamery	Ind	J. Cummings	Beaver.	Beaver	F. E. Lewis.	S. & G. C.	Test.	
65	Cooper'	sRenner Bros	Ind	Renner Bros.	Grand Junc	....	....	Sep'tr	Test.	
66	Grand Junc	Renner Bros.	Ind	Renner Bros	Grand Junc	Grand Junc	C. S. Renner	Sep'tr	Test.	
67	Madrid	Madrid	Ind	M. Laborde	Madrid	Madrid	N. Laborde	Sep'tr	Test	111
68	Ogden	Renner's Creamery.	Ind	Renner Bros	Grand Junc	Ogden	....	Sep'tr	Test.	
69	Renner.	Renner's Creamery.	Ind	Renner Bros	Grand Junc	Grand Junc	G. W. Renner	Sep'tr	Test.	
70	Rosendale, Hamilton Co.	Rosendale Co-op. C'y Co	Co-op.	E. P. Anderson, Pres	Rosendale, Hamilton Co.	Story City	P. F. Soenke	Sep'tr	Test	798

	Bremer County.									
71	Bremer	Bremer Creamery Co	Co-op.	F. C. Kohagen, Sec	Bremer	Bremer	John Prier	Sep'tr	Test	337
72	Bremer	Western Douglas Cr'y	Co-op.	A. Hoppenworth, Sec	Seigel	Bremer	A. F. Saddler	Sep'tr	Test.	
73	Denver	Farrington Cr'y Co.	Co-op	H. Steege, Sec.	Waterloo	Waterloo	P. Hasler	Sep'tr	Test	293
74	Denver	First Maxfield Cr'y Co.	Co-op.	Wm. Millins, Sec	Denver	Waverly	W. McKeen	Sep'tr	Test.	
75	Frederika	Frederika Cr'y Ass'n	Co-op.	A. Johnston, Pres	Frederika	Tripoli	F. Finch	Sep'tr	Test.	
76	Grove Hill	Grove Hill Creamery	Co-op	C. Shillington, Pres.	Grove Hill	Fairbank	F. D. Daniels	Sep'tr	Test.	
77	Klinger	Klinger Creamery	Ind	C. H. Diekman	Klinger	Dunkerton	C. H. Diekman	Sep'tr	Hd.	
78	Plainfield	Horton Stock Cr'y Co	Co-op	A. Cunningham	Horton	Plainfield	A. M. Bethka	Sep'tr	Test	791
79	Plainfield	Cedar Vale Creamery	Co-op	T. D. Harrington	Plainfield	Plainfield	C. M Balsey	Sep'tr	Hd.	
80	Sumner	Excelsior Creamery Co	Co-op	J. J. McConkey	Mentor	Sumner		Sep'tr.		
81	Sumner	Spring Fountain Cr'y Co	Co-op	Joe Volker, Sec	Sumner	Sumner	O. E. Meyerhoff	Sep'tr	Hd.	
82	Sumner	Sumner Creamery Co.	Co-op	M Wescott, Sec.	Sumner	Sumner	B. Winks	Sept'r	Hd.	
83	Sumner	Little Valley Creamery	Co-op	J. Schwake, Sec	Buck Creek	Sumner	F. M. Zell	Sep'tr	Hd.	
84	Sumner	Climax Creamery Co	Co-op.	J. Ambrose, Pres.	Sumner	Sumner	F. Engel	Sep'tr	Hd.	
85	Tripoli	Seigel Creamery	Co-op.	E. Moeller, Sec	Tripoli	Tripoli	William True	Sep'tr	Test.	782
86	Tripoli	Golden Key Creamery	Ind	William Meyerhoff	Key	Tripoli	H Meyerhoff	Sep'tr	Hd.	
87	Tripoli	Fremont Creamery Co.	Co-op.	A. Chopin, Sec	Tripoli	Tripoli	W. W. Day	Sep'tr	Test	766
88	Tripoli	Tripoli Creamery Co	Co-op.	J. Martin, Sec.	Tripoli	Tripoli	F. Oltrogge	Sep'tr	Hd.	
89	Tripoli	Maxfield Creamery Co.	Co-op	O. Jahuke	Knittel	Tripoli	H Thies	Sep'tr	Hd.	
90	Tripoli	Potter's Siding Cr'y.	Co-op	William Bany.	Tripoli	Tripoli	W. Stegeman	Sep'tr	Test.	
91	Tripoli	Wapsie Valley Cr'y Co	Co-op	R. Tiedt, Sec	Wapsie	Tripoli.	Frank Huntley	Sep'tr	Hd.	150
92	Waverly	Washington Cr'y Co	Co-op.	E. J. Thies, Sec	Waverly	Waverly	H. J. Freie	Sep'tr	Hd.	154
93	Waverly	Artesian Creamery Co.	Co-op	H. O. Meier, Pres.	Artesian	Waverly	H. A. Griese	Sep'tr	Hd.	
94	Waverly	La Fayette Creamery	Ind	B. Cornforth	Waverly	Waverly	H. Piegors	Sep'tr	Test.	687

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*s*Skim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle nu r.
	Buchanan County.									
95	Aurora	Elliott & Speed	Ind	Elliott & Speed	Aurora	Aurora	—— Speed	Sep'tr	Test	855
96	Brandon	Brandon Creamery Co.	Co-op	W. W. Bain, Sec	Brandon	Mt. Auburn	H. B. Kanouse	Sep'tr	Test	149
97	Fairbank	Fairbank F'm'rs Cr'y Co	Co-op	E. Sanborn, Sec	Fairbank	Fairbank	Marvin Higby	Sep'tr	Test	710
98	Hazelton	Hazelton F'm'rs Cr'y Co	Co-op.	L. A. Brush, Sec	Hazelton	Hazelton	M. W. Ashby	Sep'tr	Test	54
99	Independence	Independence Cr'y	Ind	Weins-Shillinglaw	Independence	Independence	James McBride	Sep'tr	Test	750
100	Jesup	Jesup Creamery Co	Co-op.	James Dalton, Sec	Jesup	Jesup	C. R. Fuller	Sep'tr	Test	174
101	Lamont	Lamont Creamery Co	Co-op	J. T. Frezona, Sec	Lamont	Lamont	W. Smarzo	Sep'tr	Test	785
102	Otterville	Otterville Creamery Co	Co-op.	C. L. Bright, Sec	Otterville	Independence	Martin Yundt	Sep'tr	Test	187
103	Rowley	Rowley Creamery Co	Co-op.	W. C. Brady, Sec	Rowley	Rowley	John Paler	Sep'tr	Test	743
104	Stanley	Stanley Creamery Co	Ind	John Elliott	Lamont	Stanley	F. W. Strong	Sep'tr	Test.	
105	Vista	Vista Creamery Co	Co-op.	A. G. Brown, Sec	Vista	Independence	Wm. Evans	Sep'tr	Test.	
106	Walker	Homerville Creamery	Ind	W. W. Wilde	Walker	Walker	E. J. Font	Sep'tr	Test.	
107	Winthrop	Winthrop Creamery	Ind	Henry Plank	Winthrop	Winthrop	H. Plank	Sep'tr	Test	178
108	Winthrop	sQuasqueton	Ind	Henry Plank	Winthrop			Sep'tr	Test.	
109	Winthrop	Gold Coin Creamery	Ind	D. E. Coffin	Winthrop	Winthrop	D. E. Coffin	Sep'tr	Test.	
	Buena Vista County.									
110	Alta	Alta Creamery	Ind	C P. Cornelussen & [Bro	Alta	Alta	E. K. Gurnsey	Sep'tr	Test	313
111	Marathon	Farmers' Co-op. Cr'y	Co op.	E. R. Stangland, Sec	Marathon	Marathon	P. O. Lindstrom	Sep'tr	Test	1,009

112	Marathon......	Fairfield Creamery Co..	Co-op	C. G. England, Sec..	Marathon......	Marathon......	J. A. Smith	Sep'tr ..	Test ..	89
113	Newell	Coon River Co-op. Cry..	Co-op.	Hans Kruse, Sec ...	Newell.	Newell	P.O. Flaskega'rd	Sep'tr ..	Test ..	797
114	Newell	sNewell Creamery.... .	Ind ...	C. Nielson	Newell.	Newell	Geo. Ellison.....	Sep'tr ..	Test ..	253
115	Newell.........	sCole..	Ind ...	C. Nielson	Newell	....	....	Sep'tr ..	Test.	
116	Newell	Boese....................	Ind ...	C. Nielson	Newell.	....	....	Sep'tr ..	Test.	
117	Peterson, Clay county.	Crescent.......	Ind ...	Collins & Jordan .	Peterson	Peterson, Clay [Co.	C. H. Jordan ..	Sep'tr ..	Hd.	
118	Sioux Rapids..	Sioux Rapids Creamery	Ind ...	E. D. Peck	Sioux Rapids..	Sioux Rapids..	E. D. Peck.......	Sep'tr ..	Test	
119	Storm Lake....	Storm Lake Creamery..	Ind ...	Huck Bros.	Storm Lake....	Storm Lake....	Chas. Huck	Sep'tr ..	Hd.	
	Butler County.									
120	Allison.........	Northern West Pt. Cr'y.	Co-op	H. Delness.........	Greene.	Greene	W. Weinthe....	Sep'tr ..	Hd.	
121	Aplington	Aplington Creamery...	Ind ...	Patterson Bros	Aplington	Aplington	H. Patterson .	Sep'tr ..	Hd....	17
122	Aplington	Hitesville Creamery....	Ind ...	James P. Johnston..	Hitesville......	Bristow...	....	Sep'tr ..	Hd.	
123	Aplington	Monroe Central Cr'y. ..	Co-op.	A. Ontjes, Sec.......	Aplington	....	W. Lenius.......	Sep'tr ..	Hd.	
124	Austinville ..	White Rose Creamery..	Ind ...	Patterson, Bode Brs	Austinville....	Austinville....	Sam'l Patterson	Sep'tr ..	Hd.	
125	Bristow .. .	Clover Lawn.	Co-op.	J. G. Du Bois, Pres .	Bristow ,......	Bristow	E. E. Jones	Sep'tr ..	Test ..	42
126	Bristow	sAredale	Co-op.	J. G. Du Bois, Pres ..	Bristow..	....	....	Sep'tr ..	Test .	
127	Butler Center..	Butler Center Cr'y.....	Ind ...	W. J. Daniels.......	Butler Center.	Allison.........	H. C. Goodrich .	Sep'tr ..	Test ..	20
128	Clarksville	Oak Grove Creamery...	Co-op	H. W. Kitchen, Mgr	Clarksville ..	Clarksville	H. W. Kitchen..	S.& G.C.	Test ..	1,014
129	Coster..........	Coster Creamery... .. .	Ind ...	E. L. Beard..........	Decorah.. ...	Parkersburg...	A. Oleson.......	Sep'tr .	Test .	
130	Durmont ...	Clutterville Creamery.	Co-op.	James Santee, Sec...	Clutterville ...	Durmont......	James Santee...	Sep'tr ..	Test ..	508
131	Greene........	Coldwater Co-op. D. A..	Stock	M. Wilson..........	Greene........	Greene........	L. J. Sargent	S.& G.C	Test .	
132	New Hartford.	Beaver Creamery Co...	Co-op.	D. L Hurlbut Sec..	New Hartford	New Hartford.	J. A. Ranney...	Sep'tr ..	Test ..	182
133	New Hartford	Albion Creamery........	Co-op.	S. S. Philo..........	New Hartford.	New Hartford.	O. L. Courbat...	Sep'tr ..	Hd....	1,138
134	New Hartford.	Crescent Creamery.....	Co-op.	L. W. Jameson, Pres.	New Hartford.	New Hartford.	George Palmer..	Sep'tr ..	Test .	
135	New Hartford.	Wait & Curtis...........	Ind...	Wait & Curtis..	New Hartford.	New Hartford.	W. C. Curtis.....	Sep'tr ..	Hd.	

sSkim Stations.

OWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner test-bottle number.
	Butler County	*—Continued.*								
136	Parkersburg	Parkersburg Creamery	Ind	Codner & Palmer	Parkersburg	Parkersburg	W. H. Codner	Sep't r	Hd	762
137	Shell Rock	Shell Rock Creamery	Stock	H. H. Goodsell, Sec.	Shell Rock	Shell Rock	H A. Miller	Sep'tr	Test	89
138	Shell Rock	Victory Creamery	Co op.	C. S. Colburn, Pres.	Waverly	Shell Rock	H. Woodcock	Sep'tr	Test	244
139	Shell Rock	Star Co-op. Creamery	Co-op	L. H. Mead	Shell Rock	Shell Rock	F. Beal	Sep'tr	Hd.	
140	Shell Rock	Columbia Creamery	Ind	Isaac Hull	Coster	Shell Rock	Isaac Hull	Sep'tr	Hd.	
	Calhoun County.									
141	Crandall	Williams Creamery	Ind	P. J. Beswick	Fonda	Fonda	J. L. Allen	Sep'tr	Test	311
142	Lake City	Elm Grove.	Ind	J. J. Fitzsimons	Elm Grove	Lake City	J. J. Fitzsimons.	Sep'tr	Test	692
143	Manson	Manson Creamery	Ind	G. B. Moon, Mgr.	Manson	Manson	G. B. Moon	Sep'tr	Test.	
144	Pomeroy	Twin Lakes Co-op. Cr'y.	Co-op.	C. J. Hartling, Sec.	Pomeroy	Pomeroy	O. Olsen	Sep'tr	Hd	828
145	Pomeroy	Butler C't'r Co-op. Cr'y.	Co-op.	F. H. Meyer, Pres.	Pomeroy	Knoke	E. E. Dodge	Sep'tr	Test.	
146	Pomeroy	Pomeroy Co-op. Cr'y	Co-op.	E. C. M. Brienholz	Pomeroy	Pomeroy		Sep'tr	Test	866
147	Rockwell City.	Rockwell C'y Butter Co.	Ind	Blow Bros	Rockwell City.	Rockwell City.		Sep'tr	Test.	
	Carroll County									
148	Arcadia	Golden Star Creamery	Co-op	W. F. Erp, Sec.	Arcadia	Arcadia		Sept'r	Test.	
149	Breda	Breda	Ind.	Ed. Rehker	Arcadia	Arcadia	A. Jackson	Sept'r	Hd.	360
150	Dedham	Dedham	Ind.	H. L. Fest	Dedham	Dedham.	H. L. Fest.	Sept'r	Test.	1,037
151	Coon Rapids	sDedham	Ind.	H. L. Fest	Dedham			Sept'r	Test	
152	Glidden	Glidden	Ind.	W. R. Howard	Glidden	Glidden.	W. R Howard	Sept'r	Test.	

153	Halbur	Excelsior	Ind.	Hoelker Bros	Halbur	Halbur	F. Hoelker	Sept'r	Test.	204
154	Halbur	Rose Valley	Ind.	C. Kohorst	Roselle	Halbur	C. Kohorst	Sept'r	Hd.	
155	Halbur	sHalbur	Ind.	Hoelker Bros	Manning.			Sept r	Test.	
156	Manning	Manning	Ind.	Hoelker Bros	Manning	Manning	W. F. Miller	S.& G.C.	Hd.	
157	Mt. Carmel	Mt. Carmel	Ind.	Ed. Rehker	Arcadia	Breda	W. Hiners.	Sept'r	Hd.	
158	Templeton	Templeton Cr'y Co	Co-op.	H. Fangman	Templeton	Templeton	M. J. Wagner	S.& G.C.	Hd.	
159	Willey	Willey	Ind.	B. Greteman	Willey	Dedham.	Wm. Witte	Sept'r	Test.	889
	Cass County.									
160	Atlantic.	Elgin Creamery Co	Ind.	C. Sands, Pres.	Chicago, Ill	Atlantic.	Louis Schack.	Sept'r	Test.	
161	Lewis	sElgin Creamery Co	Ind.	C. Sands, Pres.	Chicago, Ill			Sept'r	Test.	
162	Lyman	sElgin Creamery Co	Ind.	C. Sands, Pres	Chicago, Ill			Sept'r	Test.	
163	Marne	sElgin Creamery Co	Ind.	C. Sands, Pres.	Chicago, Ill			Sept'r	Test.	
164	Massena	sElgin Creamery Co	Ind.	C. Sands, Pres.	Chicago, Ill			Sept'r	Test.	
165	Massena	sElgin Creamery Co	Ind.	C. Sands, Pres.	Chicago, Ill			Sept'r	Test.	
166	Wiota.	sElgin Creamery Co	Ind	C Sands, Pres.	Chicago, Ill			Sept'r	Test.	
	Cedar County.									
167	Durant.	Durant B. & C Assn	Stock.	C. Sorgenfrey, Sec.	Durant	Durant	F. Puck	S.& G.C.	Hd.	
168	Bennett	Golden Star Creamery	Ind	A. Hinrichs & Co	Lowden	Bennett	W. H. Kroeger	S.& G.C.	Hd.	117
169	Bennett, No. 1.	sGolden Star Creamery.	Ind	A. Hinrichs & Co	Lowden			S.& G.C.	Hd.	
170	Bennett, No. 2.	sGolden Star Creamery.	Ind	A. Hinrichs & Co	Lowden			S.& G.C.	Hd.	
171	Center Dale	sCenter Dale	Ind	L. B. Pickering	W. Liberty-Muscatine Co			Sep'tr	Test.	
172	Clarence	Clarence	Ind	C. W. Singlehurst	Elgin, Ill	Clarence	C. L. Woodling	G. C.		
173	Clarence	Cedar	Ind	H. L. Dean	Tipton	Clarence		G. C.		
174	Lowden	Union Farmers	Co-op.	Charles Reinking	Lowden	Clarence	Henry Struck	S.& G.C.	Test	726
175	Springdale	Hopewell Creamery	Ind	C. G. Eves	West Branch	West Branch	C. G. Eves	Sep'tr	Test	41

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sSkim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gather'd cream, or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Cedar County—Continued.									
176	Springdale.	Hopewell Creamery...	Ind.	O. G. Eves...	West Branch..	.....	.....	Sep'tr ..	Test.	
177	Tipton	Cedar Creamery	Ind ...	H. L. Dean..........	Tipton	Tipton	Wilbur Johnson	G. C.		
	Cerro Gordo County.									
178	Clear Lake ...	Clear Lake..........	Ind ...	S. W. Kennedy	Clear Lake	Clear Lake....	G. W. Kennedy.	Sep'tr ..	Test ..	713
179	Mason City ...	Mason City Creamery..	Ind ...	H. F. Turner	Mason City....	Mason City....	L. C. Crepow...	Sep'tr ..	Test ..	299
180	Portland......	Portland............ ...	Ind ...	W. F. Kehm	Portland	Portland.......	A. J. Mitchell...	Sep'tr ..	Test ..	66
181	Rock Falls.....	Rock Falls.............	Co-op.	H. F. Gildner.......	Rock Falls.....	Rock Falls.....	Gilbert Oleson..	Sep'tr ..	Test.	
182	Rock Falls.....	Mayflower	Co-op.	J. F. Cochonour.....	Rock Falls.....	Rock Falls.....	J. F. Cochonour.	S.& G.C.	Test ..	155
183	Rock Falls	Owen Center...........	Ind ...	Fish & Colvin..	Rockford	Rockford.......	C. F. Fish........	Sep'tr ..	Test.	
184	Rockwell	Rockwell	Ind ...	Lakins & Gault ...	Rockwell	Rockwell	J. L. Lakins.....	Sep'tr ..	Test ..	291
185	Rockwell	Rockwell	Co-op.	J. Gerber, Sec.......	Rockwell	Rockwell	J. Gerber	Sep'tr ..	Test.	
186	Swaledale......	Pleasant Valley	Ind ...	F. J. Foord	Swaledale......	Swaledale......	T. J. Foord	S.& G.C.	Test.	
187	Thornton	Thornton	Ind ...	George W. Kennedy	Thornton	Thornton	J. H. Clark ...	Sep'tr ..	Test ..	776
188	Ventura. ...	Model Co-op. D. A......	Co-op.	W. Specht, Sec.	Ventura	Ventura	John Ward	Sep'tr ..	Test.	
	Cherokee County.									
189	Aurelia	Aurelia	Ind ...	Knirtzew & Matson.	Aurelia........	Aurelia	P. Matson......	Sep'tr .	Test ..	358
190	Cleghorn.	Cleghorn Creamery....	Ind ...	Sheusralt Bros	Rock Valley...	Cleghorn	....	Sep'tr ..	Hd.	
191	Larrabee	Larrabee	Ind ...	Alex. Younger	Larrabee	Larrabee	....	Sep'tr ..	Test.	
192	Marcus.........	Marcus.................	Ind ...	Skewis & Likens ...	Marcus	Marcus.........	S. S. Likens	Sep'tr ..	Test.	

193	Meriden..	Meriden.................	Ind...	O. C. Adams.........	Meriden........	Meriden........	O. C. Adam .. .	Sep'tr ..	Test.	1,021
194	Quimby..... ..	Shaul & Sanford's.......	Ind...	Shaul & Sanford....	Quimby........	Quimby..... ..	A. J. Sanford....	Sep'tr ..	Hd....	
195	Washta	Washta Creamery Co...	Co-op.	A. A. Fuller, Sec ...	Washta.........	....	....	Sep'tr ..	Test.	
	Chickasaw County									
196	Alta Vista.....	Alta Vista Farmers' Creamery Ass'n.......	Co-op	Wm. Vick, Sec.	Alta Vista.....	Alta Vista.....	C. Clapper......	Sep'tr ..	Test..	55
197	Bassett	Clover Dale............	Co-op	L. J. Young, Sec....	Bassett	Bassett.........	S. Butler........	Sep'tr ..	Test..	638
198	Boyd............	Boyd Farmers' Cr'y...	Co-op.	Geo. Brown, Sec....	Boyd	Boyd	....	Sep'tr ..	Test.	
199	Deerfield.	Deerfield...........	Co-op.	J. W. Kane, Sec.....	Deerfield......	Alta Vista ...	Chas. Meader...	Sep'tr ..	Test..	676
200	Devon..........	Devon F'm'rs Cr'y Ass'n	Co-op.	E. P. Sheffield, Sec..	New Hampton	Devon	Dan Biener....	Sep'tr ..	Test..	301
201	Fredericksb'rg	Dresden Creamery......	Ind...	J. H. Kolthoff, Mgr.	Williamstown .	New Hampton.	W. Struble......	Sep'tr ..	Test.	
202	Fredericksb'rg	Fredericksburg But.F'y	Co-op.	Wm. Bee, Sec........	Fredericksb'rg	Fredericksb'rg	E. F. Beebe.....	Sep'tr	Test..	184
203	Ionia.........	Ionia Farmers' Cr'y Co.	Co-op	J. W. Cogley, Sec ...	Ionia......... .	Ionia...... ...	P. N. Williams..	Sep'tr ..	Test..	168
204	Jerico.........	Jerico Creamery.......	Co-op.	W. P. Reed, Sec.....	Jerico.........	New Hampton.	Jno. P. Whaler..	Sep'tr ..	Test..	886
205	Lawler...	Jacksonville Creamery.	Co-op.	C. E Pierce, Sec. ...	Lawler.........	New Hampton.	R. E. White....	Sep'tr ..	Test.	
206	Lawler........	Lawler Creamery Ass'n	Co-op	H. M. Kout, Sec	Lawler.........	Lawler........	Jno. A. Sullivan	Sep'tr ..	Test..	104
207	Lawler........	Little Turkey Cr'y As..	Co-op.	W. G. Makepeace, Sec	Little Turkey.	Lawler.........	....	Sep'tr ..	Test..	284
208	Nashua	Fremont Creamery Co..	Co-op.	E. Lehman, Sec.....	Prosper........	Nashua	W. J. Simmons..	Sep'tr ..	Test..	645
209	Nashua	Moody-Sharples Cr'y...	Ind...	S. W. McKee.........	Nashua	Nashua	....	G. C.		
210	Nashua	Nashua Butter Co......	Ind..	S. B. Bair, Manager.	Nashua..	Nashua	....	Sep'tr ..	Test..	639
211	Nashua	Republic Co-op Cr'y Co.	Co-op.	J. Caldwell, Sec.....	Republic.......	Nashua	E. Richards.....	Sep'tr ..	Test.	
212	New Hampton.	New Hampton......	Ind...	J. H. Kolthoff......	Williamstown.	New Hampton.	Ph. Wesp	Sep'tr ..	Test..	22
213	Washington ...	N. Washington F'm'rs Creamery Ass'n... ..	Co-op.	Geo Rudolph, Sec...	Washington ...	Devon	A W.Thaericher	Sep'tr ..	Test..	997
214	Williamstown.	Williamstown Cr'y......	Ind.	J H. Kolthoff, Prop.	Williamstown.	New Hampton.	F. G. Kolthoff...	Sep'tr ..	Test..	25
15	Williamstown.	Williamstown Cr'y As..	Co-op.	H. H. Bailey, Pres..	Williamstown.	New Hampton.	W. R. Leighton	Sep'tr ..	Test.	

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sSkim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
216	*Clarke County* Murray	Elgin Creamery Co	Ind	O. Sands, Pres	Chicago, Ill	Murray	James Currie	Sep'tr	Test.	
217	Murray	sElgin Creamery Co	Ind	O. Sands, Pres.	Chicago, Ill			Sep'tr	Test.	
218	Hopeville	sElgin Creamery Co	Ind	O. Sands, Pres	Chicago, Ill			Sep'tr	Test.	
219	Woodburn	Woodburn Cr'y Co	Ind	C. O. Mohler	Woodburn	Woodburn	C. O. Mohler	Sep'tr	Test	716
220	*Clay County.* Dickens	Dickens Creamery	Ind	C. W. Parsons, Mgr.	Dickens	Dickens	C. W. Parsons	Sep'tr	Test	1,058
221	Dickens	Sioux Valley Cr'y	Ind	C. W. Parsons, Mgr.	Dickens	Dickens	A. Vavrichek	Sep'tr	Test	1,059
222	Everly	Spring Creek	Co-op.	C. Peterson, Sec.	Everly	Everly	C. Peterson	Sep'tr	Test	79
223	Fostoria	Fostoria Creamery	Stock.	Frank Riley, Sec	Fostoria	Fostoria	H.A Shillenb'g'r	Sep'tr	Test	1,134
224	Marathon	Mud Lake Cr'y Co	Ind	Wesche Bros	Marathon	Marathon	Chas. Baker	Sep'tr	Test	875
225	Peterson	Star	Ind	W. L. Beach	Willow Creek	Peterson	Ira Stewart	Sep'tr	Test	787
226	Spencer	Riverton Creamery Co	Ind	A. J. Paddock	Spencer	Spencer	O. B. Ross	Sep'tr	Test	292
227	Spencer	Spencer Creamery	Ind	Lauck Bros	Spencer	Spencer	Geo. Mitchell	Sep'tr	Test	1,147
228	Spencer	Summit	Ind	A. D. Lauck	Spencer	Spencer	W. A. Lauck	Sep'tr	Test	1,148
229	*Clayton County.* Communia	Communia Cr'y Ass'n	Co-op.	H. Wistrick, Sec	Communia	Littleport	George Gould	Sep'tr	Test	759
230	Edgewood	Bear Creek	Ind	H. F. Berger	Edgewood	Edgewood	Henry Walds	Sep'tr	Test	334
231	Edgewood	Fidelity	Ind	H. F. Berger	Edgewood	Edgewood	E. J. Whipple	Sep'tr	Test	335
232	Elkader	Highland Cr'y Ass'n	Co-op.	H. Olesen, Sec	Elkader	Elkader	D. Whipple	Sep'tr	Test	186

233	Elkader	Elkader	Ind	A. O. Elvidge	Elkader	Elkader	Harvey Clough.	Sep'tr	Test.	
234	Elkport	Elkport	Ind	A. O. Elvidge	Elkader	Elkport	Ole Houge	Sep'tr	Test.	
235	Farmersburg	Farmersburg Cr'y Co	Co-op	C. F. Meier, Sec	Farmersburg	Farmersburg	F. Daubenb'rg'r	Sep'tr	Test	1,005
236	Garnavillo	Garnavillo F'm'rs Cr'y.	Co-op	E. W. Kregel, Sec	Garnavillo	Clayton	J. L. Clark	Sep'tr	Test	199
237	Giard	Giard.	Ind	A. O. Elvidge	Elkader	Froelich	L. Bernatz	Sep'tr	Test.	
238	Gunder	sClermont Valley	Co-op.	F. F. Ferguson	Clermont, Fay	ette county		Sep'tr	Test.	
239	Littleport	Littleport	Ind	F. T. Pilkington	Littleport	Littleport	A. B. Jones	Sep'tr	Test.	
240	Luana	Luana Farmers' Cr'y	Co-op.	Emil Pufahl, Sec	Luana	Luana	W. S. Gould	Sep'tr	Test	27
241	McGregor	McGregor Creamery	Co-op.	W. I. Knowles, Sec.	McGregor	McGregor	C. C. Corlett	Sep'tr	Test	296
242	Mederville	Mederville Creamery	Ind	Wm. Brinkhous	Mederville	Mederville	Lew Goodwin	Sep'tr	Test.	
243	Osborne	Osborne	Ind	A. O. Elvidge	Elkader	Osborne	A. H. Peacock	Sep'tr	Test	162
244	Osterdock	Osterdock Creamery Co	Co-op.	E. A. Bush, Sec	Osterdock	Osterdock	W. C. Wamsley	Sep'tr	Test	367
245	Read	Read Creamery	Stock.	W. W. Wilke, Sec	Elkader	Elkader	C. G. Smith	Sep'tr	Test	109
246	St. Olaf	St Olaf.	Ind	A. O. Elvidge	Elkader	St. Olaf.	Henry Harson	Sep'tr	Test	161
247	Strawberry Pt.	Strawberry Pt. F's As'n	Ind	A. R. Carrier, Sec	Strawberry Pt.	Strawberry Pt.	H. R. Swartz	Sep'tr	Test	678
248	Volga City	Volga City F. Op. C. Co.	Co-op.	G. A. Cummings, Sec	Volga City.	Volga	Joe Jones	Sep'tr	Test	325
249	Watson	Blue Grass Creamery	Co-op.	John Geraghty, Sec.	Watson	Monona	E. L. Geno	Sep'tr	Test	80
	Clinton County.									
250	Andover	Springbrook	Ind	John Newman & Co.	Elgin, Ill	Andover		Sep'tr	Test	798
251	Browns, No. 1.	sSpringbrook	Ind	J Newman & Co	Elgin, Ill.			Sep'tr	Test.	
252	Browns, No. 2.	sSpringbrook	Ind	J. Newman & Co	Elgin, Ill.			Sep'tr	Test.	
253	Charlotte	Springbrook	Ind	J. Newman & Co	Elgin, Ill.	Charlotte		Sep'tr	Test	642
254	Delmar	Springbrook	Ind	J. Newman & Co	Elgin, Ill	Delmar.		Sep'tr	Test	353
255	Elwood.	Springbrook	Ind	J. Newman & Co	Elgin, Ill	Elwood		Sep'tr	Test	795

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sSkim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Clinton County—Continued.									
256	Lost Nation, No. 28	sDiamond Creamery Co.	Ind	Simpson, McI. & Co.	Boston, Mass.	Monticello		Sep'tr	Test.	
257	Delmar Junction, No. 26	sDiamond Creamery Co.	Ind	Simpson, McI. & Co.	Boston, Mass.	Monticello		Sep'tr	Test.	
258	Grand Mound	Grand Mound C. C. Co.	Co-op.	C. J. Schunter, Sec,	Grand Mound	Grand Mound	Henry Better	Sep'tr	Hd.	
259	Buena Vista	Grand Mound C. C. Co.	Co-op.	C. J. Schunter, Sec.	Grand Mound			Sep'tr	Hd.	
260	Low Moor	Springbrook	Ind	J. Newman & Co	Elgin, Ill	Low Moor		Sep'tr	Test.	
261	Quigley	Springbrook	Ind	J. Newman & Co	Elgin, Ill	Quigley		Sep'tr	Test.	
262	Smithtown, No. 19	sDiamond Creamery Co.	Ind	Simpson, McI. & Co.	Boston, Mass.			Sep'tr	Test.	
263	South Grove, No. 22	sDiamond Creamery Co.	Ind	Simpson, McI. & Co.	Boston, Mass.			Sep'tr	Test.	
264	Welton	sSpringbrook	Ind	J. Newman & Co	Elgin, Ill			Sep'tr	Test.	
	Crawford County.									
265	Charter Oak	Charter Oak Cr'y Co	Co-op.	G. Fred Fiene	Charter Oak	Charter Oak	Monroe M Black	Sep'tr	Test.	1,130
266	Denison	Denison Creamery	Ind	C. Eleraft	Denison	Denison	C. E. Craft	Sep'tr	Test.	194
267	Holenzolen	sDenison Creamery	Ind	C. Eleraft	Denison			Sep'tr	Test.	
268	Kiron	Stockholm	Ind	K. Mattson	Kiron	Odebolt		Sep'tr	Hd.	
269	Kiron	sOtto Valley	Ind	K. Mattson	Kiron			Sep'tr	Hd.	
270	West Side	Hayes Township Cr'y	Ind	W. H Pruter, Jr	West Side	West Side	Stephen Jans	Sep'tr	Test.	668

271	Aspinwall .	sHayes Township Cr'y..	Ind...	W. H Pruter, Jr....	West Side......	....	....	Sep'tr ..	Test.	
272	Manilla........	Hayes Township Cr'y...	Ind...	W. H. Pruter, Jr....	West Side......	Manilla........	Stephen Jans....	Sep'tr ..	Test.	
	Dallas County.									
273	Dallas Center..	Dallas Center...........	Co-op.	A. J. Wise...........	Dallas Center.	Dallas Center..	W. H. Hall......	Sep'tr ..	Test.	
274	Dexter.........	Dexter Creamery.......	Ind...	K. C. Pierce	Dexter.........	Dexter.........	H. F. Pierce.....	Sep'tr ..	Test..	180
275	Perry	Red Star................	Ind...	J. Moody	Perry..........	Perry..........	J. M. Moody......	Sep'tr ..	Test.	
276	Van Meter.....	Zieman............	Ind. .	Wm. Zieman........	Van Meter.....	Van Meter.....	R. O. Storck......	Sep'tr ..	Test ..	281
277	Waukee........	Waukee Co-op. Cr'y....	Co-op.	O. R. Rich, Sec.....	Waukee	Waukee........	L. R. Winn	Sep'tr ..	Test..	190
278	Woodward.....	Woodward Creamery...	Ind...	H. P. Calonky.......	Woodward.....	Woodward.....	H P. Calonky...	Sep'tr .	Test..	204
	Davis County.									
279	Bloomfield.....	Bloomfield..............	Ind...	W. H. Davis	Bloomfield ...	Bloomfield....	J. L. Herman....	Sep'tr ..	Test..	730
280	Floris	C. B Caldwell & Son....	Ind...	C. B. Caldwell & Son	Floris	Floris	W. R. Caldwell .	Sep'tr ..	Test..	135
281	Pulaski	Pulaski	Ind...	J. J. Miller.	Pulaski	Pulaski	W. S. Stover.....	S. & G. C.	Test.	
	Decatur County.									
282	Grand River...	Grand River B. & C. Fact	Stock.	P. Griffin, Sec........	Grand River...	Grand River...	Fred Taylor.....	Sep'tr..	Test.	
283	Leroy	sHumeston Creamery ..	Ind...	F. G. Hyde, Mgr.. ..	Humeston, Wayne Co....	....	....	Sep'tr...	Test.	
	Delaware County.									
284	Almoral........	Almoral Creamery	Stock.	F. L. Carpenter, Sec.	Almoral.......	Almoral........	E M. Newcomb.	Sep'tr...	Test..	114
285	Colesburg......	Colesburg Creamery ...	Co-op	R. C. Currie.	Colesburg......	Almoral........	A. Landis, Jr...	Sep'tr...	Test..	226
286	Delaware......	Delaware Creamery Co.	Co-op	C. A. Pierce..........	Delaware......	Delaware.....	P. F. Madden...	Sep'tr...	Test..	86
287	Delaw're No. 14	sDelaware Creamery Co	Co-op.	Simpson, M'Intire Co	Boston, Mass..	Monticello	....	Sep'tr...	Test.	
288	Delhi	Silver Spring Creamery	Co-op.	E. R. Stone, Sec	Delhi.	Delhi...........	Chas. Howard..	Sep'tr...	Test..	141
289	Dundee	Dundee	Ind...	H. F. Beyer..........	Edgewood.....	Dundee	Geo. Briggs.....	Sep'tr...	Test.	
290	Earlville.......	Gilt Edge	Ind...	J. M. Dunn & Co...	Earlville.	Earlville	J. M. Dunn	Sep'tr...	Test.	
291	Ehler...........	Jas. Henderson & Sons.	Ind..	J. Henderson & S'ns	Ehler...........	Ehler.	C. M. Vohs......	Sep'tr...	Test.	
292	Hazel Green...	Hazel Green.	Ind...	Frank Dickey Co....	Hazel Green...	Ryan..........	F. Houston......	Sep'tr...	Test.	239

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sSkim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Delaware County—Continued.									
293	Hazel Green...	sBroadway..............	Ind...	Frank Dickey Co....	Hazel Green...	....	....	Sep'tr...	Test.	
294	Hopkinton. ..	Pleasant Valley.........	Ind...	C. A. Biddle.........	Hopkinton	Hopkinton	C. A. Biddle....	Sep'tr...	Test..	870
295	Hopkinton.....	Hopkinton Co-op. Cr'y.	Co-op	M. L. McGlade, Sec..	Hopkinton	Hopkinton	I. H. Griffith....	Sep'tr...	Test..	784
296	Hopkinton.....	Keystone...............	Ind...	J. W. Merrill.........	Cedar Falls....	Hopkinton	L. R. Burnham.	Sep'tr...	Test.	
297	Manchester....	Spring Branch Cr'y.....	Co-op.	W. J. Davis, Sec.....	Manchester....	Manchester....	A. A. Palmer....	Sep'tr...	Test..	76
298	Manchester....	Mead's Creamery.......	Ind...	C. W. Mead & Son...	Manchester....	Thorpe.........	Wm. D. Mead...	Sep'tr...	Test..	93
299	Manchester....	Barryville Company....	Co-op.	Chas. C. Barry, Sec.	Barryville.....	Manchester....	E. C. Pudney....	Sep'tr...	Test..	740
300	Oneida....	Tuttle Brothers.........	Ind...	Tuttle Brothers.....	Oneida.........	Oneida.........	H. Sliter........	Sep'tr...	Test..	1,146
301	Petersburg	Bear Grove.............	Co-op.	Jas. Gehhardt, Sec..	Petersburg	Dyersville	Jacob Schmidt..	Sep'tr...	Hd....	641
302	Petersburg	sBear Grove	Co-op.	Jas. Gehhardt, Sec..	Petersburg	....	....	Sep'tr...	Hd.	
303	Petersburg	Petersburg Co-op. Cr'y.	Co-op.	F.J.Klostermann,S'c	Petersburg	Dyersville	Frank Rubby...	Sep'tr...	Hd.	
304	Ryan..........	Russian.................	Co-op.	Fred Miller.........	Ryan.	Ryan.....	Fred Miller.....	Sep'tr...	Test.	
305	Ryan..........	Hazel Green Co-op Cr'y	Co-op.	F. B Dickey, Sec....	Hazel Green...	Ryan..........	J. W. Atwood...	Sep'tr...	Test..	115
306	Sand Spring ...	Sand Spring Co-op. Cr'y	Co-op.	F. E. Wood..........	Sand Spring ...	Sand Spring ...	Harry Williams	Sep'tr...	Test..	96
307	Silver Creek...	Silver Creek	Ind...	Geo. E. Packer. ...	Silver Creek...	Ryan..........	Geo. E. Packer..	Sep'tr...	Test.	
308	Thorpe	Honey Creek...........	Ind..	H. F. Beyer....... ..	Edgewood......	Delaware......	W. K. Pallard ..	Sep'tr...	Test..	72
309	Thorpe.	Thorpe.	Ind...	Harris & Co....	Jesup..........	Thorpe.........	J. Schamn. ...	Sep'tr...	Test.	
310	Worthington, Dubuque Co.	Central Creamery Co...	Co-op.	J. H. White, Sec.....	Worthington ..	Hopkinton	H. F. Lehmkuhl	Sep'tr...	Test.	

	Dickinson County.									
311	Everly	West Port	Ind	Kessey & Winton	Milford	Milford	E. J. Pall	Sep'tr	Test.	246
312	Milford	Milford F'mrs B.& C.As.	Ind	Geo. Chase, Pres	Milford	Milford	Geo. E. Blunt	Sep'tr	Test.	
313	Spirit Lake	Spirit Lake B. & C Fact.	Ind	—— Dickinson	Spirit Lake	Spirit Lake	C. A. Painter	Sep'tr	Test.	875
	Dubuque County.									
314	Balltown	Balltown Creamery Co.	Co-op.	C.D.Harrington,Sec.	Balltown	Waupeton	Henry Koehler	Sep'tr	Test.	
315	Bernard	Austin Co-op. Cr'y	Co-op.	John Curran, Sec.	Garry Owen	Cascade	S. M. Adamson.	Sep'tr	Hd.	705
316	Cascade	Cascade Co-op Cr'y	Co-op.	F. A. Hamil, Sec.	Cascade	Cascade	I. L. Moss	Sep'tr	Test.	885
317	Cascade	Hazel	Ind.	Minhart & Wardel	Cascade	Cascade	—— Wardel	Sep'tr	Test.	
318	Cascade	Crystal Falls	Ind.	H. L. Dehner.	Cascade	Cascade	W. J. Aitchison.	Sep'tr	est.	
319	Cascade	Butterfield Cr'y Co	Co-op.	Stuart Martin, Pres.	Cascade	Cascade	Henry Boyer	Sep'tr	Test.	1,123
320	Dyersville	Farmers Golden Star	Co-op.	J. H. Prier, Sec.	Cascade	Dyersville	Jay Smith	Sep'tr	Test.	1,189
321	Dyersville	Pin Oak	Co-op.	M. P. Leibold, Sec.	Pin Oak	Pin Oak	A. H. Ford	Sep'tr	Test.	148
322	Epworth	Epworth Creamery Co.	Co-op	D. Burrell, Sec	Epworth	Epworth	P. H. Stockwell.	Sep'tr	Hd.	674
323	Farley	Farley Creamery Co	Co-op	J.F.Schoonover,Pres	Farley	Farley	C. E Minehart	Sep'tr	Test	659
324	Farley	Johns Creek	Ind.	Vibber & Heald	Farley	Farley	C. Bartholomew	Sep'tr	Hd.	
325	Farley	Pleasant View	Ind.	Vibber & Heald	Farley	Farley	John Higgs	Sep'tr	Hd.	
326	Fillmore	Fillmore Creamery Co.	Co-op.	W. Craft, Sec.	Fillmore	Fillmore	N. B Francois	Sep'tr	Hd.	
327	Lattners	Lattners Spring Co	Co-op.	E. Hauser, Sec.	Lattners	Graf	Samuel Strief	Sep'tr	Hd.	202
328	Lore	Lore	Co-op.	C. Kemp, Sec	Lore	Lore	F. Koehler	Sep'tr	Test.	
329	Luxemburg	Globe	Co-op.	Globe	Luxemburg	Dyersville	Jacob Friedman	Sep'tr	Test.	245
330	New Vienna	New Vienna Central Creamery Co.	Co-op.	Joseph Schemmel	New Vienna	Dyersville	M. Kaut	Sep'tr	Hd.	719
331	Peosta	Highland	Ind.	George Franke	Peosta	Peosta	George Franke.	Sep'tr	Hd.	238
332	Rickardsville	Farni Creamery	Ind.	Farni Creamery Co.	Rickardsville	Durango	Joseph Farni	Sep'tr	Hd.	
333	Rickardsville	Oak Grove	Co-op.	M. Regan	O'Neill	Waupeton	August Bang	Sep'tr	Hd.	

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sSkim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck comp'ny.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Dubuque County—Continued.									
334	Rockdale ...	Columbian............	Ind...	Laude Bros.........	Rockdale......	Dubuque......	J. Wiles.........	Sep'tr..	Test.	361
335	Sherrill.......	Sherrill...............	Co-op.	J. C. Boleyn, Sec ..	Dubuque......	Specht's Ferry.	Fred Koeller....	Sep'tr..	Test.	
336	Tivoli	Hickory Valley Cr'y....	Co-op.	L. F. Fegeler, Sec....	Dyersville.....	Dyersville.....	C. H. Arnold....	Sep'tr..	Hd.	
337	Worthington ..	Spring Valley Cr'y Co..	Co-op.	R. E. Knapp, Sec....	Worthington ..	Worthington ..	H P. Bancroft..	Sep'tr..	Test..	759
338	Worthington ..	Worthington	Ind...	W. Lattner.....	Worthington ..	Worthington ..	C. Buhler........	Sep'tr..	Hd.	
339	Zwingle........	Zwingle...............	Ind...	Nemmers & Butler..	LaMotte.......	Zwingle........	Joe Blunt..	S.& G.C.	Test.	
	Emmet County.									
340	Armstrong. .	Farmers Creamery......	Ind...	G. Stewart....... ...	Armstrong.....	Armstrong.....	Fred Wilcox	Sep'tr..	Test..	626
341	Armstrong.....	Forsythe	Co-op.	H. W. Gaarde, Sec...	Armstrong.....	Armstrong.....	T. B. Garden....	Sep'tr..	Test..	695
342	Estherville.....	Estherville.............	Co-op	M. C. Peterson.......	Estherville.....	Estherville.....	....	Sep'tr..	Test..	631
343	Wallingford...	Wallingford Cr'y Co....	Co-op.	P. I. Miller..........	Wallingford...	Wallingford...	B. Lanning......	Sep'tr..	Test..	310
	Fayette County.									
344	Alpha..........	Alpha Farmers' Cr'y....	Co-op.	A. L. Davis, Sec......	Alpha..........	Waucoma......	C. N. Beach....	Sep'tr..	Test..	63
345	Arlington......	Brush Cr'k F'm'rs C. A.	Co-op.	C. H. Day, Sec.......	Arlington......	Arlington......	C. H. Day	Sep'tr..	Test.	
346	Aurora	Gundlach Creamery....	Ind...	A. O. Kingsley.......	Strawberry Pt.	Aurora	A. A. Axtell	Sep'tr..	Test..	675
347	Clermont......	Clermont Valley Cr'y..	Co-op.	F. F. Ferguson.	Clermont......	Clermont......	A. Crickson. ..	Sep'tr..	Test.	
348	Clermont......	Burr Oak.......	Co-op.	Henry Smith, Sec...	Clermont......	Clermont......	I. Iverson......	Sep'tr..	Test..	724
349	Eldorado.......	*Eldorado...............	Ind...	Schiedemantel Bros	Ossian, Winneshiek county	....	....	Sep'tr..	Test..	

350	Elgin..........	Elgin Farmers' Dairy Co	Co-op.	A. S. Houg, Sec......	Elgin..........	Elgin.	Ed. Hanson.....	Sep'tr ..	Test.	
351	Fayette........	Fayette Cr'y Ass'n	Co-op.	J. M. Edmunds......	Fayette........	Fayette	O. H. Wilson....	Sep'tr ..	Test ..	287
352	Hawkeye	Hawkeye	Ind ...	Bortner & Wilkening	Hawkeye	Hawkeye	A. P. Bortner...	Sep'tr ..	Test ..	156
353	Maynard	Harlan Creamery Co...	Co-op.	A F. Crawford, Sec.	Maynard	Maynard	A. D. Farnham.	Sept'r ..	Test ..	362
354	Minkler........	Oran Creamery Co	Co-op	J. D. Watters, Sec...	Minkler........	Fairbank	J. L. Blunt	Sep'tr ..	Hd.	
355	Oelwein........	Jefferson................	Co-op.	J. H. Meyer, Sec.....	Oelwein........	Oelwein........	O. H. McQueen..	Sep'tr ..	Test ..	140
356	Oelwein........	Oelwein Farmers' Cr'y..	Co-op.	E. E. Day, Sec	Oelwein........	Oelwein........	H. H. Opperman	Sep'tr ..	Test ..	102
357	Randalia.......	Fairview................	Co-op.	A. M. Holmes, Sec...	Randalia.......	Randalia.......	——Johnson.....	Sep'tr ..	Test ..	15
358	Randalia.......	Randalia Creamery .. .	Co-op.	G. D. Terrey, Sec....	Randalia.	Randalia.......	F. C. Billings....	Sep'tr ..	Test ..	290
359	Richfield	Richfield........	Co-op.	....	....	....	....	Sep'tr ..	Test.	
360	St. Lucas.......	Farmers' Co-op. Cr'y...	Co-op.	J. J. Mihm, Sec......	St. Lucas.......	Waucoma......	Mark Blong. ...	Sep'tr ..	Test ..	1,038
361	Sumner	Center Valley Cr'y Co..	Co-op.	A. E. Fridly, Sec....	Sumner	Sumner	C. R. Bracey....	Sep'tr ..	Hd.	
362	Stanley	Stanley	Co-op.	Frank Strong, Sec...	Stanley	Stanley	....	Sep'tr ..	Test.	
363	Westgate	Westgate Creamery Co	Co-op.	W. J. McSweeny.....	Westgate	Westgate	Robert Maillie..	Sep'tr ..	Test ..	373
364	West Union ...	W. Union F'm'rs' D. Co	Co-op.	Chas. Dwyer, Sec....	West Union....	West Union....	William Tilson.	Sep'tr ..	Test ..	40
365	West Union....	Union Creamery........	Stock.	J. T. Riley, Mgr	West Union ...	West Union....	S. Peterson.....	S. & G.C.	Test ..	262
366	West Union....	sUnion Creamery.......	Stock.	J. T. Riley, Mgr	West Union....	....	....	S. & G.C.	Test.	
367	*Floyd County* Charles City...	Charles City Creamery.	Ind ...	J. C. Dalby, Prop....	Charles City...	Charles City...	Fred Janes	S. & G.C.	Test ..	164
368	Charles City...	Flood Creek Cr'y Ass'n.	Co-op.	L. Melcher, Pres....	Charles City...	Charles City...	John Halfner...	Sep'tr ..	Test.	
369	Floyd	Floyd....................	Ind ...	Winks & Day........	Floyd	Charles City...	C. H. Day.......	Sep'tr ..	Test ..	693
370	Niles...........	Niles......... ..	Ind ...	Madatt & Clark	Algona	Charles City...	Fred Madatt...	Sep'tr ..	Test ..	712
371	Nora Springs..	Nora Springs	Ind ...	R. C. Kennedy.......	Nora Springs..	Nora Springs..	R. C. Kennedy..	S. & G.C.	Test ..	10
372	Rockford	Rockford Co-op. D. As..	Co-op.	C. L. Crowell, Sec...	Rockford	Rockford	W. J. Grunes....	G. C.		

sSkim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY, OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Franklin County.									
373	Ackley....	Edna..	Ind...	J. Martin & Son.....	Ackley.........	Ackley..	O. Strassburg...	Sep'tr..	Hd....	701
374	Chapin.........	Chapin.................	Ind...	A. E. Hoffman.....	Chapin.........	Chapin.........	A. E. Hoffman..	Sep'tr..	Test..	77
375	Dows........	Farmers' Co-op. Cr'y Co	Co-op.	S. H. Mendell, Sec...	Dows...........	Dows....	J. N. Bossuot...	Sep'tr.	Test..	81
376	Faulkner......	sFaulkner.......... ...	Ind...	J. Martin & Son.....	....	....	....	Sep'tr..	Test.	
377	Geneva.. ..	Geneva.....	Ind...	I. W. Meyers.......	Hampton......	Geneva...... ..	B. E. Peterson..	S. & G.C.	Test.	
378	Hampton.....	Hampton.....	Ind...	Juhl & Kennedy .	Hampton.....	Hampton......	J. Kennedy.....	G. C.		
379	Hampton.....	Pleasant Ridge......	Ind...	McKellar & Cochran	Hampton......	Hampton......	L. C. Cochran...	Sep'tr..	Hd....	113
380	Latimer.......	Hamilton Creamery....	Co-op.	F. Rodemeyer, Sec..	Hampton.....	Latimer........	Geo. Jorgensen.	Sep'tr.	Test.	
381	Latimer.......	Latimer.............	Co-op	Chas. Johnson, Sec..	Latimer........	Latimer..	J. Madsen.......	Sep'tr..	Test.	
382	Popejoy.	Popejoy Creamery Co..	Co-op	J. A. Iverson, Sec...	Popejoy.......	Popejoy...... .	W. H. Baker....	Sep'tr..	Test.	
383	Sheffield......	Sheffield Cr'y Ass'n.....	Co-op.	L. B Carhart, Sec...	Sheffield.......	Sheffield.......	C. Triplett......	Sep'tr..	Test..	185
	Greene County.									
384	Adazo.......	Adazo Co-op. Cr'y Co...	Co-op.	M M. Reading, Sec..	Adaza.........	Adaza..........	W. S. Fey.......	Sep'tr..	Test..	708
385	Farlin.........	Farlin Creamery.......	Ind...	W. S. Irving.........	Farlin.........	Farlin....	W. S. Irving.....	Sep'tr..	Test..	344
386	Grand Junc....	Hardin Township......	Ind...	J. C. Harker.........	Grand Junc....	Grand Junc....	W. Elling,.......	Sep'tr..	Hd.	
387	Grand Junc....	Renners'...............	Ind...	Renner Bros.........	Grand Junc....	Grand Junc....	....	Sep'tr..	Test..	118
388	Cooper........	nCooper.....	Ind...	Renner Bros	Grand Junc....	....	....	Sep'tr..	Test.	
389	Jefferson......	Renners' Creamery.....	Ind...	Renner Bros........	Grand Junc....	Jefferson..... .	....	Sep'tr..	Test.	

390	Paton	Paton Creamery	Ind	George E. White	Paton	Paton	Geo. E. White	Sep'tr	Test	877
391	Rippey	Rippey	Ind	Richardson & Remington	Ruthven, Palo [Alto Co.	Rippey	E. Tuttle	Sep'tr	Test	224
392	Scranton	Scranton Creamery	Co-op.	A. H. Fey, Pres	Scranton	Scranton	A. Adams	Sep'tr	Test	133
	Grundy County.									
393	Ackley	Johnson	Ind	J. W. Johnson	Ackley	Ackley	Theo. Newman	S. & G.O.	Hd	786
394	Beaman	Beaman Creamery	Ind	P. McNelly.	Beaman	Beaman	P. McNelly	Sep'tr	Test	267
395	Conrad	Conrad Creamery.	Ind	N. H. Blour	Conrad.	Conrad		Sep'tr	Test.	
396	Cedar Falls	Fredsville Co-op. Co	Co-op.	C. O'son, Sec.	Fredsville	Cedar Falls	A. K. Smith	Sep'tr	Test	265
397	Dairyville	Dairyville	Ind.	George Graham	Dairyville	New Hartford.	Geo. Graham	Sep'tr	Test	136
398	Grundy Center	J H. Sperry	Ind	J H. Sperry	Grundy Center	Grundy Center	Louis Cedar	Sep'tr	Test	336
399	Grundy Center	J. H. Sperry	Ind	J. H. Sperry	Grundy Center	Grundy Center	George Norton	Sep'tr	Test.	
400	Grundy Center	sJ. H. Sperry	Ind	J. H. Sperry	Grundy Center			Sep'tr	Test	
401	Holland	Holland	Ind	J. H. Sperry	Grundy Center	Holland	Peter Larson	Sep'tr	Test.	867
	Grundy County									
402	Holland	Colfax.	Ind	S. Nelson	Holland	Holland	S. Nelson	Sep'tr	Test	
403	Ivester	Ivester Creamery Co	Co-op	Geo Schwarck, Sec.	Ivester.	Eldora	E. E. Starr.	Sep'tr	Test.	273
404	Morrison.	Lincoln Spring	Ind	Patrick & Campbell	Lincoln	Lincoln	G. H. Patrick	Sep'tr	Test.	652
405	Morrison	Morrison	Ind	H. P Jackson & Bros	Morrison	Morrison	H P. Jackson	Sep'tr	Test.	1,143
406	New Hartford.	Fairfield Co-op. Cr'y	Co-op	C. Strong, Sec.	New Hartford	New Hartford.	N. M. Johnston.	Sep'tr	Test.	
407	Parkersburg	Beaver Center Cr'y	Co-op.	John R. Stowe, Sec	Parkersburg	Parkersburg	J. Christensen	Sep'tr	Test.	
408	*Reinbeck	The Fowler Cr'y Co	Ind	C. F Fowler, Pres.	Waterloo.	Reinbeck	S. E. Stevens	Sep'tr	Test.	
409	Reinbeck	Grant Township Cr'y	Ind	W. H. Scheiber, Pres	Reinbeck	Reinbeck	W. H. Scheiber	Sep'tr	Test.	
410	Wellsburg	Wellsburg	Ind	W. F. Graham	Wellsburg	Wellsburg	W. F. Graham	Sep'tr	Test.	
	Guthrie County									
411	Bagley	Bagley Creamery	Ind	H. H. Cummings	Bagley	Bagley	H. B. McGhee	G. C.	Test.	

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sSkim Stations. *Manufactures both butter and cheese.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or stock company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Guthrie County—Continued.									
412	Bayard.	sBagley Creamery	Ind	H. H. Cumm'ngs	Bagley			G. C.	Test.	
413	Guthrie Center	Guthrie Center	Ind	Andrew Wood.	Guthrie Center	Guthrie Center	H. I. Kester	Sep'tr	Test.	1,063
414	Dale City	sGuthrie Center	Ind	Andrew Wood	Guthrie Center			Sep'tr	Test.	
415	Wichita	sGuthrie Center	Ind	Andrew Wood	Guthrie Center			Sep'tr	Test.	
416	Casey	sElgin Creamery Co	Co-op	Elgin Creamery Co	Chicago, Ill			Sep'tr	Test.	
417	Menlo	Menlo Creamery Co	Co-op.	A. C. Curtis, Sec.	Menlo	Menlo	A. Kelsey	Sep'tr	Test.	
418	Stuart	Stuart Creamery	Ind	E. M. Lamos	Stuart	Stuart	A. Cochrane	Sep'tr	Test.	
419	Arbor Hill	sStuart Creamery	Ind	E. M. Lamos	Stuart			Sep'tr	Test.	
420	Earlham	sStuart Creamery	Ind	E M. Lamos	Stuart			Sep'tr	Test.	
421	Yale	Yale	Ind	Park & Son	Yale	Yale	D. C. Barthlowe	Sep'tr	Test.	1,003
	Hamilton County.									
422	Ellsworth	Ellsworth Co-op. Cr'y A	Co-op.	M. H. Brinton, Sec.	Ellsworth	Ellsworth	K. T. Naa	Sep'tr	Test.	282
423	Rose Grove	sEllsworth Co-op.Cr'y A	Co-op.	M. H. Brinton, Sec.	Ellsworth			Sep'tr	Test.	
424	Jewell	Jewell	Ind	H. K. Gronbeck	Jewell	Jewell	H. K. Gronbeck	Sep'tr	Test.	
425	Kamrar	Gold Nugget	Ind	A. O. Blow	Kamrar	Kamrar	A. O. Blow	Sep'tr	Test.	35
426	Randall	Randall Farmers' Cr'y	Co-op.	J. Clausen, Sec	Randall	Randall	H. N. Miller	Sep'tr	Test.	9
427	Stanhope	Stanhope Creamery	Ind	N. O. Blow			N. O. Blow	Sep'tr	Test.	247
428	Stratford	Star and Stratford	Ind	J. M. Daniels	Dayton	Stratford	T. H. Daniels	Sep'tr	Test.	

429	Webster City..	Poplar Grove Creamery	Ind...	D. C. Miller, Mgr....	Poplar Grove..	Webster City..	D. C. Miller......	Sep'tr ..	Test.	
430	Williams.......	Payne's Model..........	Ind...	F. R. Payne.........	Williams.......	....	F. R. Payne..	Sep'tr ..	Test. .	1,045
431	Woodstock.....	Prairie Queen Cr'y Co..	Stock	H. D. Welch.........	....	Woodstock.....	....	Sept,r ..	Test.	
	Hancock County.									
432	Britt	Crystal Creamery Co...	Co-op.	Ed. Peterson, Sec...	Britt	Britt	J. K. Johnston..	Sep'tr ..	Test. .	90
433	Britt	Britt Co-op. Cr'y Co.....	Co-op.	Jno. Fisk, Sec	Britt	Britt	Thos.H.Kenyon	Sep'tr ..	Test.	
434	Duncan	Duncan Creamery......	Co-op	John Spaller, Sec ..	....	Duncan	Ed. Chrisselles..	Sep'tr ..	Test.	
435	Garner.........	Concord Creamery Co..	Co-op.	H. C. Shaltz, Sec ...	Garner	Ventura	C. R. Conway ...	Sep'tr ..	Test. .	1,047
436	Goodell	Goodell	Ind...	C. S. Farman & Son.	Goodell	Goodell	Thomas Elder..	G. C.		
437	Klemme	Klemme Creamery Co..	Co-op	Louis Sampson, Sec.	Klemme . ..	Klemme	N. L. Palmer ...	G. C.		
438	Madison........	Madison Creamery Co..	Co-op.	C. B. Hanver	Forest City....	Forest City ...	....	Sep'tr ..	Test.	749
439	West Lake.....	West Lake Cr'y Co	Co-op.	F. E McCorkle	West Lake.....	Goodell	A. B. Bailey	Sep'tr ..	Test.	
	Hardin County.									
440	Alden	Alden Co-op. Cr'y Co...	Co-op	R. L. Bolitho, Sec...	Alden	Alden	R.M. Rishworth	Sep'tr ..	Test. .	1,062
441	Cleves..........	Cleves	Ind...	J. M. Martin & Son..	Ackley..... .	Cleves	W. F. Gimes.....	Sep'tr ..	Hd.	
442	Eldora	Hughes	Ind...	M. E. Hanson, Sec..	Hughes	Hughes	M. E. Hanson...	Sep'tr ..	Test. .	216
443	Hubbard.......	Hubbard Co-op. Cr'y Co.	Co-op.	J. V. White, Sec....	Hubbard.......	Hubbard.......	D. E. Whitney..	Sep'tr ..	Test.	
444	Iowa Falls.....	Iowa Falls Cr'y Co... ..	Ind...	G. L. Whinnery	Iowa Falls....	....	A. P. Buchanan	Sep'tr ..	Test.	
445	Lawn Hill	Lawn Hill..............	Ind..	George B. Strayer ..	Eldora	Lawn Hill . .	Geo B. Strayer.	G. C.....	....	51
446	Radcliffe.......	Lincoln Creamery Co...	Co-op.	M. Christian, Pres..	Radcliffe	Radcliffe	P. Larson	Sep'tr ..	Test.	
447	Radcliffe	Concord & Scott Co-op. Creamery............	Co-op.	T. L. Tompson, Sec.	Radcliffe	Radcliffe	M. J. Mansager.	Sep'tr ..	Test. .	880
448	Radcliffe.......	Buckeye	Ind...	Carl Clausing	Radcliffe	Radcliffe	Carl Clausing...	Sep'tr ..	Test. .	107
449	Robertson	Robertson	Ind...	J. Windecker & Son	Robertson . ..	Robertson	S. O. Windecker	Sep'tr ..	Hd.	
450	Union	Union Creamery........	Co-op.	F. E. Culp, Sec ...	Union	Union	Thos. E. Culp...	Sep'tr ..	Test. .	280
451	Whitten........	Whitten Cr'y Ass'n	Co-op.	G. N. Carr, Sec......	Whitten	Whitten	G. N. Carr......	G. C.		

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*Skim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Harrison County.									
452	California Jct.	California Junction....	Ind...	M.H.Teilmann & Co.	California . .	Cal. Junction..	M H. Teilmann.	Sep'tr .	Test.	
453	Dunlap	Dunlap Creamery	Co-op.	A. C. Gilchrist	Dunlap	Dunlap	F. W. Shellman.	Sep'tr ..	Test.	
454	Little Sioux....	Little Sioux.	Co-op.	B L. Jones, Pres....	Little Sioux...	River Sioux ...	C. Kucker. .. .	Sep'tr ..	Test.	
455	Allen	sLittle Sioux	Co-op.	B. L Jones, Pres ..	Little Sioux...	....	....	Sep'tr ..	Test.	
456	Mo Valley.....	Mo. Valley B. & C. Co ..	Ind...	W. A. Jones, Pres...	Mo. Valley	Mo. Valley . ..	W. H Clarkson.	Sep'tr ..	Test.	
457	Magnolia	Magnolia Creamery Co.	Ind...	F. H. Cadwell, Sec..	Logan	Logan.........	R. A. McHale...	Sep'tr ..	Test.	
458	Modale	Modale.	Co-op.	F. W. Schwertley ..	Modale... ...	Modale.........	C. Schroeder...	Sep'tr ..	Test.	
	Henry County.									
459	Trenton.......	Trenton Creamery......	Ind...	W. G. Clark	Trenton	Mt. Pleasant ..	W. G. Clark.....	Sep'tr ..	Test.	
460	Wayland	Hickory Grove F. D. A.	Co-op.	N. Rich, Pres........	Wayland	Wayland	Fred Helleman.	Sep'tr ..	Test. .	52
461	Winfield	Winfield Creamery	Ind...	Eicher Bros.........	Winfield	Winfield	J. A. Eicher.....	Sep'tr ..	Test. .	991
	Howard County.									
462	Bonair	Bonair	Ind..	A. O. Elridge....	Elkader........	Bonair...... ...	J. J. McManers.	S.& G.C.	Test..	
463	Chester	Chester Co-opCr'y Ass'n	Co-op	E. O. Greene.	Chester	Chester	E. D. Capper....	G. C.		
464	Cresco...... ..	Cresco Creamery.	Ind...	W. R. Owen	Cresco..	Cresco..........	J. A. Barker...	Sep'tr ..	Test..	663
465	Elma.	Elma Creamery.........	Co-op.	A. A. Carter, Sec....	Elma	Elma...........	A. Gullrouson..	Sep'tr ..	Test..	772
466	Louther........	Acme Co-op. C'ry Co....	Co-op.	A. J. Dilly, Sec	Acme....... ..	Louther..	—Kingsbury...	Sep'tr ..	Test.	
467	Protovin.	Protivin Cr'y Ass'n.....	Co-op.	J. J. Lukes, Sec. ...	Protovin. ...	....	W. J Kodloc....	Sep'tr ..	Test..	789
468	Saratoga	Saratoga Cr'y Ass'n....	Co-op.	Wm. H. Taubman...	Saratoga.	Riceville.......	G. W. Hoopman.	Sep'tr ..	Test.	

	Humboldt County.									
469	Arnold....	Grove Co. Co-op. Cr'y...	Co-op	C. Combs, Manager.	Grove..........	Arnold.........	F. S. Wherry....	Sep'tr ..	Test.	
470	Bode	Bode Creamery Ass'n..	Co-op.	T. C Hanson, Sec...	Bode..........	Bode..........	H. Dixon........	Sep'tr .	Test..	254
471	Bradgate	Bradgate Co-op.Cr'yAss	Co-op.	L. Van Horn, Sec...	Bradgate ...	Bradgate......	E.M.Varquars'n	Sep'tr ..	Test.	691
472	Hardy....	McMurty Bros.	Ind...	McMurty Bros..	Goldfield, Wright Co.	Hardy..........	—Kelling......	Sep'tr ..	Test.	
473	Humboldt.....	Humboldt........... ...	Co-op.	G. L. Cruikshank,Sec	Humboldt.....	Humboldt.....	J. C. Hall........	Sep'tr ..	Test..	50
474	Ottosen...	Wacousta Cr'y Ass'n...	Co-op.	L. J. Olave, Sec......	Ottosen........	Ottosen	L.J.Hopperste'd	Sep'tr ..	Test..	878
475	Owl Lake.	sFountain B. and C. Co.	Ind...	B. T. Scott & Co.....	Goldfield, Wright Co...	....	....	Sep'tr ..	Test.	
476	Renwick........	Renwick Separator C'y.	Ind...	W. T. Drennen & Son	Renwick.......	Renwick.......	S. P. Drennen...	Sep'tr ..	Test..	263
477	Rutland........	Rutland Cr'y Ass'n.....	Co-op.	W. J. Brown, Sec....	Rutland........	Rutland.......	....	Sep'tr ..	Test.	
478	Thor	Clover Creamery........	Co-op	L. Oleson, Sec.......	Thor.......	Thor	I. J. Takhim....	Sep'tr ..	Test..	152
	Ida County.									
479	Arthur.........	Arthur....................	Ind...	Critchon Bros.	Arthur........	Arthur.........	Geo. Critchon...	Sep'tr ..	Test.	
480	Battle Creek..	Maple Valley..	Ind...	Nielsen & Jorgensen	Battle Creek..	Battle Creek..	Peter Nielsen...	Sep'tr ..	Hd.	
481	Galva..........	Galva	Ind...	Robt. Jorgensen ...	Galva..........	Galva..........	Robt. Jorgensen	Sep'tr ..	Hd.	
482	Holstein. ...	Holstein.	Ind...	Perpritz & Bischel..	Holstein.......	Holstein.......	....	Sep'tr ..	Hd.	
483	Ida Grove......	Ida Grove.........	Ind...	Hallam & Hubbard.	Ida Grove......	Ida Grove......	I. G. Arthur.....	Sep'tr ..	Hd.	
	Iowa County.									
484	Genoa Bluff...	Genoa Bluff	Ind...	G. R. Howard..	Genoa Bluff...	Marengo.	C. Kroft.........	S.& G.C.	Test..	181
485	Marengo.	Iowa Valley Creamery.	Ind...	H. C. Brown.........	Marengo.......	Marengo.	John Howard..	S.& G C.	Test.	
486	Millersburg....	Millersburg.............	Ind...	M. Bear.......	Millersburg....	North English.	....	G. C.		
487	North English	North English.	Ind...	Magoon & O'Brien..	North English	North English.	Dick O'Brien....	G. C.		
488	Victor,.........	Victor..........	Ind...	J. M. Mathew........	Williamsburg.	....	S. D. Beets	G. C.		
489	Williamsburg.	Williamsburg..........	Ind...	....	....	....	J. M. Mathews..	G. C.		

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sSkim Staions.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Jackson County.									
490	Andrew	Andrew Lily Creamery	Ind	C. R. Bell	Andrew	Maquoketa	A. B. Ayers	Sep'tr	Test.	
491	Baldwin, No. 27	sDiamond Creamery Co	Ind	Simpson, McI. & Co.	Boston, Mass			Sep'tr	Test.	
492	Bellevue	Springbrook	Ind	C. M. Kegler	Springbrook	Bellevue	George Whitley	G. C.		
493	Bellevue	Rose Valley Creamery	Ind	H. N. Schnier, Sec.	Bellevue	Bellevue	Frank Entring'r	G. C.		
494	Bernard, Dubuque Co.	Austin Creamery	Co-op.	J. Curran, Sec.	Cascade, Dubuque Co.	Bernard	S. M. Adamson	Sep'tr	Hd.	
495	Fulton	Fulton Creamery Co.	Co-op	S. D. Heide, Sec.	Fulton	Maquoketa	Charles Vath	Sep'tr	Test	736
496	La Motte	La Motte Creamery	Ind	Nemmers & Butler	La Motte	La Motte	Peter Butler	S. & G. C.	Test	305
597	St. Donatus	sLa Motte Creamery	Ind	Nemmers & Butler	La Motte			S & G. C.	Test.	
498	La Motte	sLa Motte Creamery	Ind	Nemmers & Butler	La Motte			S & G C.	Test.	
499	La Motte	Sterling Separator	Ind	N. A. Hoffman	La Motte	La Motte	M. J. Hoffman	S. & G C	Test	71
500	Cottonville	sSterling Separator	Ind	N. A. Hoffman	La Motte		”	S & G. C.	Test.	
501	Miles	Pioneer Creamery	Co-op.	C. W. Heynen, Sec.	Miles	Miles	Charles E. Allen	G. C.		98
502	Monmouth	Emeline	Co-op.	W. Brady & Son	Emeline	Monmouth	H. Brady	Sep'tr	Test.	
503	Monmouth	Monmouth Cream'y Co.	Co-op.	John Cass, Pres.	Monmouth	Monmouth	Samuel Conley	Sep'tr	Test	124
504	Otter Creek	Otter Creek	Ind	Laible Bros.	Otter Creek	Zwingle	William Blunt	Sep'tr	Test.	
505	Preston	Springbrook	Ind	John Newman	Elg , Ill.	Preston	”	Sep'tr	Test	781

506	Union Center..	sSpringbrook	Ind...	John Newman.......	Elgin, Ill.......	....	....	Sep'tr ..	Test.	
507	Spragueville ..	Spragueville............	Ind...	John Newman.......	Elgin, Ill.......	Spragueville...	....	Sep'tr ..	Test.	
	Jasper County									
508	Baxter........	Baxter Dairy Co.......	Ind...	Baxter Dairy Co....	Baxter.........	Baxter.........	Ralph Itskin....	Sep'tr ..	Test..	745
509	Baxter.........	Baxter..................	Ind...	Harris & Co	Jesup, Buchanan Co.......	Baxter.........	G. N. Harris. ...	Sep'tr ..	Test..	146
510	Ira............	sBaxter................	Ind...	Harris & Co	Jesup, Buchanan Co.........	....	....	Sep'tr ..	Test.	
511	Horne.........	sBaxter	Ind...	Harris & Co.........	Jesup, Buchanan Co.........	....	....	Sep'tr ..	Test.	
512	Kellogg..	Kellogg Creamery......	Ind...	J. O. Quaintance...	Kellogg.........	Kellogg..... ..	J. O. Quaintance	G. C.		
513	Metz	Metz	Ind...	John McRae.........	Metz...........	Metz	....	Sep'tr ..	Test..	1,018
514	Monroe.......	Monroe	Ind...	Chase & Stoops.....	Monroe	Monroe	E. L Girodat....	Sep'tr ..	Test..	1,005
515	Newton	Malaka.................	Ind...	H. D. Parsons	Newton.........	Newton	Charles B. Harte	Sep'tr ..	Test..	326
516	Prairie City...	Prairie City	Ind...	Chase & Stoops.....	Monroe	....	E. S. Girodat....	Sep'tr .	Test.	
517	Reasnor..... ..	Palo Alto Dairy Co....	Stock.	W. E. Caldwell, Mgr.	Reasnor	Reasnor	F. E. Bean	Sep'tr ..	Test..	1,032
518	Valeria	Farmers' Co-op. Cr'y A.	Co-op.	J. M. Ingle, Sec ..	Valeria	....	J. M. Ingle	Sep'tr ..	Test.	
	Jefferson County.									
519	Batavia........	Batavia Creamery Co..	Ind...	John Kumboltz.....	Salina	Batavia........	F. Kumboltz....	S & G.C.	Test.	
520	Fairfield	Fairfield	Ind...	John McLane........	Fairfield.	Fairfield.	J. McLane	Sep'tr ..	Test..	689
521	Abingdon	sFairfield	Ind...	John McLane	Fairfield	....	....	Sep'tr ..	Test.	
522	Four Corners..	Kauffman's Sep'tr Cr'y.	Ind...	A. M. Kauffman. ...	Four Corner...	Lockridge ..	W. C. Smith.....	Sep'tr ..	Test..	881
523	Germanville...	Germanville Cr'y Ass'n.	Co-op.	J. F. Craff	Germanville...	Brighton	J. H. Johnson...	Sep'tr ..	Test..	153
524	Lockridge	Lockridge	Ind...	E. Hartmar.........	Lockridge	Lockridge	E. Hartmar......	Sep'tr .	Test..	882
525	Glasgow	Glasgow................	Ind...	E. Hartmar.........	Glasgow	Glasgow	E. Hartmar......	Sep'tr ..	Test.	
526	Glasgow	sLockridge	Ind ..	E. Hartmar.........	Lockridge	....	....	Sep'tr ..	Test.	
527	Packwood	Packwood Creamery...	Ind...	J. D. Eicher.........	Packwood.....	Packwood......	A. W. Barron....	Sep'tr ..	Test..	992
528	Salina..........	Salina Creamery Co	Co-op.	J. H. Allender.... .	Salina..........	Beckwith	Henry Goers....	Sep'tr ..	Test..	116

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sSkim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER MAKER.	Separator, gathered cream or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Johnson County.									
529	Amish	Deer Creek Mills D'y A.	Co-op.	J. B. Miller, Pres....	Amish	Wellman.......	L. J. Guengerich	Sep'tr ..	Test.	
530	Lone Tree......	Hildebrand Creamery..	Ind ...	E. Hildebrand.......	Lone Tree	Lone Tree	E. Hildebrand.	G. C.		
531	North Liberty.	North Liberty.	Ind ...	J. W. Andele. ...	North Liberty.	Iowa City......	J W. Andele..	Sep'tr ..	Test..	88
532	North Liberty	sGreen Castle	Ind ...	J. W. Andele.........	North Liberty	....	....	Sep'tr ..	Test.	
533	Oasis..........	Oasis Creamery Co.....	Ind ...	V. D. Bumgardner..	Oasis..........	....	H. Gaymon.....	Sep'tr ..	Test..	698
534	Iowa City......	sOasis Creamery Co. ..	Ind ..	V. D. Bumgardner..	Oasis.	....	....	Sep'tr ..	Test.	
535	Oxford.........	Oxford Creamery Co....	Ind ...	J. H. Bell	Oxford.........	Oxford.........	J. H. Bell	G. C.		
536	Solon..........	Cedar Creamery Co	Ind ...	Weed & Houser.	C. Rapids, Linn Co	Solon.	Fred Raeder....	Sep'tr ..	Test	
537	Solon...........	Solon....	Ind ...	Fisher & Beck.......	Solon.	Solon.	....	G. C.		
	Jones County.									
538	Amber..	Amber	Ind ...	W. H. Sanford. ...	Amber	Amber	Jas. Cleveland..	Sep'tr ..	Test.	85
539	Amber..........	Hazel Green Co-op......	Co-op.	T. I Platner, Sec....	Amber. ...	Amber.	A. E. Porter.....	Sep'tr ..	Test..	790
540	Amber.........	Jackson......	Ind ...	W. H. Sanford.......	Amber.	Amber	J. W. Evans...	Sep'tr ..	Test..	83
541	Anamosa	Fawn Creek	Ind ...	J. S. Condit	Anamosa.......	Anamosa. ...	Port Wilkison ..	Sep'tr ..	Test..	287
542	Anamosa	Franklin Creamery ...	Ind ...	Vinton Smith..	Anamosa.	Anamosa. ...	Vinton Smith...	Sep'tr ..	Test..	295
543	Cass Center,...	Center Creamery........	Ind ...	Thomas & Muzzey..	Anamosa. ..	Anamosa. ...	S. M. Muzzey....	Sep'tr ..	Test.	
544	Cascade, Dubuque Co..	Temple Hill Creamery.	Co-op.	Jos. Gavin, Pres.	Cascade	Cascade....	G. Adamsen.....	Sep'tr .	Hd.	
545	Center Jct.....	Rose Creamery..........	Ind ...	C. Hanna	Center Jct.....	....	F. Beckman.....	Sep'tr ..	Test..	707

546	Hale..........	Hale Creamery Co......	Ind...	C. E. Walston, Mgr.	Hale...........	Hale...........	W. H. Bronwell.	Sep'tr..	Test..	135
547	Langworthy .	Clover Leaf Creamery..	Co-op	H. Harms, Sec.......	Langworthy...	Amber..........	S. N. Glass	Sep'tr..	Test..	307
548	Martelle........	Martelle................	Ind...	James Sinclair......	Martelle	Martelle..	J. Sinclair.......	Sep'tr..	Test..	221
549	Brookside......	sMartelle...............	Ind...	James Sinclair......	Martelle	....	....	Sep'tr..	Test.	
550	Monticello......	Diamond Creamery Co..	Ind...	Simpson, McI. & Co.	Boston, Mass..	Monticello.....	G. L. Pretteplase	Sep'tr..	Test..	223
551	Monticello, No. 3 D.......	sDiamond Creamery Co.	Ind...	Simpson, McI. & Co.	Boston, Mass..	....	....	Sep'tr..	Test.	
552	Langworthy, No. 3 G	sDiamond Creamery Co	Ind...	Simpson, McI. & Co.	Boston, Mass..	....	....	Sep'tr..	Test.	
553	Langworthy, No. 4	sDiamond Creamery Co.	Ind...	Simpson, McI. & Co.	Boston, Mass..	....	....	Sep'tr..	Test.	
554	Prairiesburg, No. 5..........	sDiamond Creamery Co.	Ind...	Simpson, McI. & Co.	Boston, Mass..	....	....	Sep'tr..	Test.	
555	Monticello, No. 6.........	sDiamond Creamery Co	Ind...	Simpson, McI. & Co	Boston, Mass..	....	....	Sep'tr..	Test.	
556	Monticello, No. 10.............	sDiamond Creamery Co.	Ind...	Simpson, McI. & Co.	Boston, Mass..	....	....	Sep'tr..	Test.	
557	Wyoming, No. 18.............	sDiamond Creamery Co.	Ind ..	Simpson, McI. & Co.	Boston, Mass..	....	....	Sep'tr..	Test.	
558	Oxford Junction, No. 20..	sDiamond Creamery Co.	Ind...	Simpson, McI. & Co.	Boston, Mass..	....	....	Sep'tr..	Test.	
559	Monticello.....	Downerville Creamery.	Co-op.	J. F. Laude, Sec.....	....	Monticello	F. J. Crussenberg	Sep'tr..	Test..	1,028
560	Monticello......	Star Co-operative Cr'y.	Co-op.	Geo. Ambuehl, Sec.	Bowen..........	Monticello. ...	O. W. Brazelton.	Sep'tr..	Test..	679
561	Onslow.........	Coral Creamery........	Ind...	J. G. Bader.....	Clayford.......	Onslow....	J. G. Bader.....	Sep'tr..	Test..	97
562	Scotch Grove..	Rose Creamery	Ind...	C. M. Hanna.........	Scotch Grove..	....	....	Sep'tr..	Test..	656
563	Wyoming	Wyoming Association..	Co-op.	J. W. Rhodes........	Wyoming	Wyoming	Isaac H. Smith.	Sep'tr..	Test.	
	Keokuk County.									
564	Delta...........	The Delta Creamery....	Ind...	James Dickson......	Delta...........	Delta....	H. S. Wood......	Sep'tr..	Hd...	24
565	Hedrick........	Springbrook.......	Ind...	Jno. Newman & Co.	Elgin, Ill.......	....	....	Sep'tr..	Test..	616
566	Keota	Keota Creamery........	Stock	S. E. Reisman, Sec..	Keota	Keota	W. W. Carpenter	Sep'tr..	Test.	
567	What Cheer....	What Cheer Creamery.	Ind...	Emery & Frunk.....	What Cheer ...	What Cheer ...	F. L. Emery.....	Sep'tr..	Test.	
568	Barnes City....	sWhat Cheer Creamery	Ind...	Emery & Frunk.....	What Cheer ...	....	....	Sep'tr..	Test.	

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sSkim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Kossuth County.									
569	Algona.........	Algona Co-op. Cr'y Co..	Co-op.	J. B. Hofins	....	Algona	A. W. Stersbach	Sep'tr ..	Test..	286
570	Bancroft	Bancroft Creamery Co.	Co-op.	F. Thola, Sec...	Bancroft	Bancroft	A. Johnson......	Sep'tr ..	Test.	
571	Bancroft	Seneca Co-op. Cr'y Co..	Co-op.	M. Jenson, Sec.	Seneca.........	Bancroft	John Tibbetts ..	Sep'tr ..	Test.	
572	Buffalo Fork..	Buffalo Fork Cr'y Co....	Co-op	J. Englehardt	Buffalo Fork..	Burt	R. Lane..........	Sep'tr ..	Test..	633
573	Burt..	Burt Co-op. Cr'y Co....	Co-op.	W. A. Chapman, Sec.	Burt	Burt...........	D. L. Driver.....	Sep'tr ..	Test..	697
574	Fenton........	Fenton Co-op. Cr'y Co..	Co-op.	G. W. Newel, Sec....	Fenton.........	Burt	H. W. Pettibone.	Sep'tr ..	Test..	348
575	German Vall'y	German Valley Co-operative Co.	Co-op	P. E. Johnston. ..	German Valley	Bancroft.	E. A. Bacon.....	Sep'tr ..	Test.	
576	Germania......	Germania..............	Co-op.	Josra Morck, Sec	Germania.. ...	Germania......	Josra Morck ...	Sep'tr ..	Test.	
577	Hobart.........	Hobart............	Co-op.	A. Gilmore, Sec......	Hobart........	Hobart.........	A. Murrell.......	Sep'tr ..	Test..	300
578	Irvington......	Irvington Co-op. Cr'y Co	Co-op.	S. R. Roney, Sec. ..	Irvington......	Irvington ...	H. A. Varney...	Sep'tr .	Test..	289
579	Ledyard	Ledyard Co-op. Cr'y As.	Co-op.	E. K. Skimmer	Ledyard......	Ledyard........	E. K. Jenkins. ..	Sep'tr .	Test..	1,051
580	Lone Rock.....	Lone Rock Cr'y Co......	Co-op.	John Bernhard, Sec.	Lone Rock.....	Burt...........	L. C. Adams.....	Sep'tr ..	Test..	128
581	Luverne	Luverne Cr'y Assn......	Co-op.	Geo. L. Minkler.. ..	Luverne........	Luverne........	Geo L. Minkler.	Sep'tr ..	Test.	
582	Lott's Creek...	Lott's Creek Co-op. C'ry	Co-op.	A. Krause.	Lott's Creek...	Whittemore....	M. Deyer.......	Sep'tr ..	Test.	
583	Sexton	Sexton Co-op. Cr'y Co ..	Co-op.	E. E. Laage, Sec.....	Sexton	Sexton........	F. O. Bacon......	Sep'tr ..	Test.	
584	St. Joseph	St. Joseph Dairy Assn..	Co-op.	F. Puysen, Sec.......	St. Joseph.....	Livermore....	Fred Bacon.. ..	Sep'tr ..	Test.	
585	Swea City......	Swea City Creamery Co	Co-op.	....	....	Swea City... ..	J. A. Coonholm.	Sep'tr ..	Test. .	280

586	Wesley	Wesley Co-op. Cr'y	Co-op.	P. E. Skaw, Sec	Wesley	Wesley	N. E. Henans	Sep'tr	Test	208
587	West Bend	Garfield Creamery Co	Co-op	R. Berningham, Sec	West Bend	West Bend	J. L. Reid	Sep'tr	Test	268
588	Whittemore	Whittemore Cr'y Co	Co-op.	Thos. Carmody, Sec	Whittemore	Whittemore	G A. Hanna	Sep'tr	Test	1,050
	Lee County.									
589	Argyle	Argyle Creamery	Ind	E. E. Quebe'g	Argyle	Argyle	E. C. Queberg	Sep'tr	Test.	
590	West Point	West Point Creamery	Ind	H. Rogge & Co.	West Point	West Point	H. Hesse	G. U	Test.	
	Linn County									
591	Alburnett	Alburnett	Stock	J. M. Robins, Sec	Robins	Alburnett	Chas. Royden	Sep'tr	Test	657
592	Center Point	Center Point	Ind	Geo. L. Weeks	Center Point	Center Point	John Derflinger	Sep'tr	Test.	
593	Central City	Central City	Ind	Henderson& Nietert	Central City	Central City	John Nietert	Sep'tr	Test	58
594	Central City	Valley Farm	Ind	P. G. Henderson	Central City	Central City	H. Weber	Sep'tr	Test	4
595	Coggon	North Side Creamery	Co-op.	F. Lehman, Sec	Coggon	Coggon	F. Lehman	Sep'tr	Hd	684
596	Coggon	Coggon	Stock.	M. Lean, Sec	Coggon	Coggon	Howard Bliss	Sep'tr	Hd.	
597	Coggon	Deep Spring	Ind	Henderson & Bowser	Coggon	Coggon	John Bowser	Sep'tr	Hd.	
598	Elmont	Elmont	Ind	S. B. Mills	Elmont	Central City	Seth B. Mills	Sep'tr	Hd.	
599	Ely	Ely and Western Cr'y	Stock.	J. C. Dvorak, Sec	Ely	Ely	L. J. Ford	Sep'tr	Test	364
600	Ely	sEly and Western Cr'y.	Stock	J. C. Dvorak, Sec	Ely			Sep'tr	Test.	
601	Fairfax	Scotch Grove	Ind	Henderson & Babc'k	Fairfax	Cedar Rapids	A. J. Babcock	Sep'tr	Hd.	
602	Lafayette	Lafayette Creamery Co	Co-op	D. W. Neighbors	Lafayette	Alburnett		Sep'tr	Test.	
603	Lisbon	W. S. Furnas Co	Ind	Krueger & Thomps'n	Lisbon	Lisbon		G. C		1,043
604	Marion	Marion	Ind	W. W. Gray	Marion	Marion	C. A. Cline	Sep'tr	Test	765
605	Prairiesburg	Nickel Plate	Ind	E. LeClere	Prairiesburg	Coggon	W. C. Lux	Sep'tr	Test	1,129
606	Prairiesburg, No. 3	sDiamond Creamery Co	Ind	Simpson, McI. & Co.	Boston, Mass	Monticello		Sep'tr	Test.	
607	Prairiesburg	Minehart & Cook	Ind	Minehart & Cook	Prairiesburg	Coggon	H. F. Cook	Sep'tr	Hd	768
608	Robins	Eureka Creamery Co	Stock.	J. B. Holsinger, Sec	Robins	Robins	R. Gould	Sep'tr	Test.	

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s Skim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Linn County	*—Continued.*								
609	Alburnett	sEureka Creamery Co..	Stock.	J. B. Holsinger, Sec.	Robins	....	....	Sep'tr ..	Test.	
610	Springfield	Phœnix	Ind ...	Irwin Paul..........	Springville	Springville	Irwin Paul......	Sep'tr ..	Test. .	381
611	Linn Grove....	sPhœnix	Ind ...	Irwin Paul..........	Springville	....	....	Sep'tr ..	Test.	
612	Toddville.....	Monroe..................	Stock.	J. B. Miller	Toddville......	Toddville.....	O. Lefaner	Sep'tr ..	Test. .	210
613	Troy Mills.....	Troy Mills Creamery...	Ind ...	E. G. Gard..........	Troy Mills.....	Walker........	J. W. Ondler....	Sep'tr ..	Hd.	
614	Walker.........	Highland Creamery Co.	Co-op.	W. Horak...........	Walker.........	Walker.........	F. H. Nietert....	Sep'tr ..	Hd	18
615	Walker.........	Walker.................	Ind ...	H. J. Nietert........	Walker....	Walker....	S. W. Laird.....	Sep'tr ..	Test.	
616	Waubeek	Crown..................	Ind ...	J. G. Fox	Waubeek	Central City...	H. C. Hemenway	Sep'tr ..	Hd.	
617	Waubeek	Waubeek	Ind ...	A. L. Corry..........	Waubeek	Viola...........	A. L. Corry......	Sep'tr ..	Hd.	
618	Waubeek	Birmingham............	Ind ...	W. J. Ross..........	Waubeek	Central City...	W. J. Ross.......	Sep'tr ..	Test.	
	Louisa County.									
619	Fredonia.......	Fredonia Creamery....	Ind ...	Thos. Carey.........	Fredonia.......	Fredonia.......	E. W. Kelly	G. C.		
620	Letts...........	Letts.....................	Ind ...	H. Hildebrand......	Letts.	Letts...........	J. M. Hildebrand	Sep'tr ..	Test.	
621	Wapello.......	Wapello.................	Ind ...	F. P. Brectbach.....	Wapello........	Wapello........	F. P. Breitbach .	G. C.		
	Lucas County.									
622	Russell........	Russell Creamery......	Co-op.	W. J. Marshall......	Russell.........	Russell.........	W. J. Marshall..	Sep'tr ..	Test..	84
	Lyon County.									
623	Inwood........	Inwood Creamery Co...	Stock.	N. Nordenack, Mgr.	Inwood.... ...	Inwood..	N. Nordenack...	Sep'tr ..	Test..	636
624	Larchwood.....	Larchwood Creamery..	Ind ...	E. Wright.....	Larchwood	Larchwood	E. Wright.......	Sep'tr ..	Hd.	

625	Lester..	Lester Creamery Co....	Co-op.	L. W. Billings. Sec..	Lester.........	Lester..........	L W. Billings...	Sep'tr ..	Hd.	
	Madison County.									
626	Earlham.......	sStuart Creamery......	Ind...	E. M. Lamos	Stuart.........	....	....	Sep'tr ..	Test.	
627	Macksburg	Cook Creamery Co.....	Ind...	J. W. Way...........	Lorimor.......	Lorimor........	J. W. Way.......	Sep'tr ..	Test.	
628	Pitzu..	Jackson Center	Ind...	E. M. Lamos.........	Stuart.........	Winterset......	E E. Gates......	Sep'tr ..	Test.	
629	Winterset.....	Cloverdale.............	Co-op.	E. E. Gates	Winterset	Winterset......	....	Sep'tr ..	Test.	
	Mahaska County.									
630	New Sharon ...	N. Sharon Produce Co..	Stock.	N. Sharon Prod. Co.	New Sharon. ..	New Sharon....	H. Martin.......	G. C.		
	Marion County.									
631	Bussey........	Bussey Creamery	Ind...	W. E. Caldwell & Co	Bussey.........	Bussey.........	R D. Caldwell..	Sep'tr ..	Test. .	1,024
632	Durham.......	Farmers' B. & C. Mfg. Co	Co-op.	C. H. Dunham, Sec..	Durham........	Durham.......	F. Larwood	Sep'tr ..	Test.	
633	Knoxville.....	Knoxville.......	Ind...	J. J. Bousquet......	Pella...........	Knoxville......	W. H. Liter	G. C.		
634	Newbern.... .	Newbern Creamery....	Ind...	Luther Biggs........	Newbern.......	Chariton..	A. D. Riggs . ..	Sep'tr ..	Test.	
635	Pella...........	Garden City Creamery.	Ind...	J. J. Bousquet......	Pella...........	Pella......	T. Smorenburg .	Sep'tr ..	Test.	
	Marshall County.									
636	Clemons	Minerva Valley Cr'y Co	Co-op.	J. Van Meter, Sec....	Clemons	Clemons Grove	H. Nolta.........	G. C.		
637	Green Mount'n	Green Mountain Cr'y...	Co-op	M. C. Bower, Pres...	Green Mount'n	....	C. S. Woods	Sep'tr ..	Test. .	1,055
638	Haverhill.....	Columbia Creamery Co.	Co-op.	M. Kunkle, Sec.....	Haverhill......	Haverhill.....	C. S. Milhiser ...	Sep'tr ..	Test. .	1,026
639	Liscomb... ...	Liscomb But. & Ch. Co.	Ind...	C. F. Biersborn, Mgr	Liscomb	Liscomb	C. F. Biersborn.	Sep'tr ..	Test. .	206
640	Melbourne.....	Farmers' Co-op. Cr'y As	Co-op.	R. Robinson, Pres...	Melbourne....	Melbourne.....	F. J. Mable.....	Sep'tr ..	Test. .	741
641	Rhodes	Eden Creamery	Ind...	J. H. Perry..........	Rhodes.........	Rhodes.........	C. A. Weeks.....	S. & G. C	Test. .	1,131
642	State Center...	State Center Farmers' Creamery Ass'n.. ...	Co-op.	E. G. Swift, Mgr...	State Center...	State Center...	Guy Thomas....	G. C.....	Test. .	16
	Mills County.									
643	Emerson.....	Blue Grass.............	Ind...	W. M. Tolander	Emerson.	Emerson.......	W. M. Tolander.	G. C.		
644	Glenwood.....	Golden Hill Dairy	Ind...	W. W. Mockelwait...	Glenwood.....	Glenwood.....	D. T. Phelps	Sep'tr ..	Test.	
645	Malvern	Malvern Creamery	Ind...	J. P. Morton.........	Malvern.......	Malvern..	....	G. C.		

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sSkim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred	Dairy commissioner's test-bottle number
	Mitchell County.									
646	Bailey	Lawn Spring	Co-op.	T. J. Wheeler	Bailey	Bailey	M. M. Blandin	S.& G.C.	Test	1,085
647	Little Cedar	Little Cedar Cr'y Co.	Co-op.	G. H. Hammond	Little Cedar	Little Cedar	C. B. French	G. C.		
648	New Haven	Farmers' Co-op. Cr'y	Co-op.	John Griffin, Sec.	New Haven	Osage	C. Thomas	G. C.		
649	Orchard	Farmers'Co-op. Cr'y As.	Co-op.			Orchard	M.V.Fairbroth'r	G. C.		
650	Osage	Rock Creek Co-op C'y A.	Co-op.	S. J. Fosholdt, Sec.	Meroa	Osage	L. McLaren	G. C.		726
651	Osage	Osage Co-op. Creamery.	Co-op.	A Bartle, Sec	Osage	Osage	D. McDugall	S.& G.C.	Test.	
652	Riceville	Riceville Co-op. Cr'y	Co-op.	S. L. Crum, Mgr.	Riceville	Riceville	G. A. Miller	S.& G.C.	Test.	
653	St. Ansgar	Farmers' Co-op. Cr'y	Co-op.	M. E. Benson	St. Ansgar	St. Ansgar	A. Anderson	G. C.		
	Monona County.									
654	Blencoe	Walnut Grove Cr'y	Ind	Geo. Brunker	Blencoe	Blencoe	Peter Beck	Sep'tr	Hd.	
655	Whiting	Whiting Creamery Co.	Co-op.	Charles Casady, Sec.	Whiting	Whiting	Niles Danielson	Sep'tr	Test.	
	Monroe County.									
656	Albia	Albia	Ind.	Tompson & Wallace	Albia	Albia	B. R. Wallace	Sep'tr	Test.	
	Montgomery County									
657	Elliott	Elgin Creamery Co.	Ind.	O. Sands, Pres.	Chicago, Ill.	Elliott	J. H. Baldwin	Sep'tr	Test	119
658	Stanton	sElgin Creamery Co.	Ind.	O. Sands, Pres.	Chicago, Ill.			Sep'tr.	Test.	
	Muscatine County									
659	Atalissa	Atalissa	Ind.	C. A. Minshell, Sec.	Atalissa	Atalissa	James Blair	S.& G.C.	Hd.	657
660	West Liberty	Cedar Valley Creamery	Ind.	S. B. Pickering	West Liberty	West Liberty	Wm. Mathew	S & G.C.	Hd.	
661	Center Dale	sCedar Valley Creamery	Ind.	S. B. Pickering	West Liberty			S.& G.C.	Hd.	

662	West Liberty	H. H. Hildebrand	Ind.	H. H. Hildebrand	West Liberty	West Liberty	E B. Hildebrand	G. O.		
663	Wilton Junct'n	Nickle Plate Creamery	Ind.	George W. Kelley	Wilton Junct'n	Wilton	O. E. Kelley	S.&G.O	Hd	980
664	Moscow	sNickle Plate Creamery	Ind.	George W. Kelley	Wilton Junct'n			S.&G.O.	Hd.	
	O'Brien County.									
665	Paullina	Union Creamery Co	Stock.	W. Strampe, Mgr	Paullina	Paullina	Wm. Strampe	Sep'tr	Hd	29
666	Paullina	Caledonia Creamery Co	Ind.	William Gehrls	Germantown	Paullina	William Gehrls.	Sep'tr	Hd.	
667	Primghar	Pleasant Park Cr'y	Ind.	Morrow & Younger.	Primghar	Primghar	Geo. G. Stoddard	Sep'tr	Hd.	
668	Sutherland	Sutherland	Ind.	A. Younger	Larrabee.	Sutherland	M. Adams	Sep'tr	Hd	67
	Osceola County.									
669	Allendorf	Allendorf	Co-op.	G. M. Alwood, Sec	Allendorf	Allendorf	A. P. Mott	Sep'tr	Test.	
670	Melvin	Sanborn	Ind.	George Wells	Sanborn	Sanborn		Sep'tr	Test.	98
671	Ocheyedan	F'm's Co-op. B. & C. Co.	Co-op.	F. J. Fousck	Ocheyedan	Ocheyedan	H. Richardson	Sep'tr	Test.	
672	Sibley	Sibley	Ind.	W. Emmett	Sibley	Sibley	W. Emmett	Sep'tr	Test.	
	Page County.									
673	Blanchard	Blanchard	Ind.	J. J. Tompson	Blanchard	Blanchard	J. J. Tompson	S.&G.O.	Te t.	
674	Clarinda	Wall Street	Ind.	Clark & Gray	Clarinda		A. H. Gay	Sep'tr	Test.	
675	Coin	Coin	Ind.	W. H. Wheeler	Coin.			Sep'tr	Test.	
676	Essex	Essex	Ind.	T. K. Elliott, Sec	Essex	Essex	W. H. Keyes	Sep'tr	Test.	1,057
677	Yorktown	Yorktown B. & C. Assn	Co-op.	F. C. Morley.	Yorktown	Yorktown	Wm. C. Kimball	Sep'tr	Test.	
678	Shambaugh	Shambaugh	Co-op.	I. W. Shambaugh, Sec	Shambaugh	Shambaugh	J. C. Murphy	Sep'tr	Test.	777
679	Shenandoah	Shenandoah B. & C. Co.	Stock.	H. C. Bedison, Sec	Shenandoah	Shenandoah	C. G. Voigt	Sep'tr	Hd.	
	Palo Alto County.									
680	Ayrshire.	Silver Creek	Co-op.	P. N. Hond, Sec	Ayrshire	Ayrshire	A. J. Blakeman.	Sep'tr	Test.	1,007
681	Curlew	Curlew	Co-op.	E. Ford, Pres	Curlew	Curlew	C. S. Christensen	Sep'tr	Test.	178
682	Cylinder	Cylinder B. & C. Assn.	Co-op.			Cylinder	F. M. Cleveland.	Sep'tr	Test.	252
683	Depew	Maple Leaf Company	Co-op.	A. Leischman, Sec.	Depew	Cylinder	Ed. Kressin	Sep'tr	Tes	51

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s Skim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Palo Alto County—Continued.									
684	Emmetsburg	Emmetsburg Cr'y Co	Stock.	L. Stuehmer, Sec	Emmetsburg	Emmetsburg	N. Kimston	Sep'tr	Test	994
685	Emmetsburg	Nevada	Co-op.			Emmetsburg	A. B. Conway	Sep'tr	Test.	
686	Fairville	Fairville	Co-op	A. Stahl	Fairville.	Whittemore	A. C Kressin.	Sep'tr	Test.	869
687	Graettinger.	Lost Island Cr'y Co	Co.op.	L C. Christenson.	Fallow.	Graettinger	C. Remington	Sep'tr	Test.	
688	Graettinger	Farmers' Co-op. Cr'y Co	Co-op.	A. O. Bergeson, Sec.	Graettinger	Graettinger	W. G. Sterzbeck	Sep'tr	Test.	
689	Mallard	Mallard B. & C. Assn.	Co-op.	Theo. Rimders	Mallard	Mallard	J. W. Finnell	Sep'tr	Test	840
690	Osgood.	Osgood	Co-op.	L. P. Stillman	Emmetsburg	Osgood	E. W. Reid	Sep'tr	Test	37
691	Rodman	Rodman Creamery Co.	Co-op.	C. J. Frye	Rodman	Rodman	J. A. Reid	Sep'tr	Test	746
692	Ruthven	Highland Butter Assn.	Co-op	F. J. Breman	Ruthven	Ruthven	W. H. Haller	Sep'tr	Test	223
693	Ruthven.	Ruthven.	Ind	H. D. Remington	Ruthven	Ruthven.	A L Remington	Sep'tr	Test	742
694	Ruthven	Trumbull Lake	Ind	H D. Remington	Ruthven	Ruthven.	E. J. Remington	Sep'tr	Test.	
695	West Bend	West Bend Co-op Cr'y Co	Co-op.	L. E. Temple, Sec	West Bend	West Bend	Thos. Clark	Sep'tr	Test	865
	Plymouth County.									
696	Akron	Akron & Sioux Valley	Co-op.	G. C. Putnam, Pres.	Akron		G. Chenowerth	Sep'tr	Test	789
697	Dalton.	Grant Township	Co-op.	H. F. Maust	Struble	Dalton	E. W Geyer	Sep'tr	Test.	
698	Ellendale	Ellendale	Co-op.	J. F. Gorman	Ellendale	Merrill.	Wm. Anderson.	Sep'tr	Test	
699	Le Mars	Le Mars Co-op. Cr'y	Co-op.	Theo Langle	Le Mars	Le Mars		Sep'tr	Test	758
700	Merrill	Merrill Creamery Co	Co-op.	R. M. Crouch, Sec.	Merrill	Merrill	C. B. Horrocks.	Sep'tr	Test	655

701	Neptune.	Neptune Co-op. Cr'y Co.	Co-op.	F. J. Dobbert, Sec.	Neptune	Le Mars	....	Sep'tr	Test.	
702	O'Leary	O'Leary Creamery Co.	Co-op.	....	....	Le Mars	A. Freese.	Sep'tr	Test.	
703	Oyens.	Oyens Co-op Cr'y Assn.	Co-op.	A. Kloster, Pres.	Oyens	Oyens	C. Mortisen	Sep'tr	Test.	
704	Remsen.	Remsen Co-op. Cr'y Co.	Co-op.	F. Bohlke, Sec.	Remsen	Remsen	D. W. Mohler	Sep'tr	Hd.	
705	Struble	Struble Creamery	Co-op.	F. Stoll	Struble	Struble	C. Vanderham	Sep'tr	Test.	
	Pocahontas County.									
706	Fonda	Lilly.	Co-op.	J. D. Fitzgerald, Sec.	Fonda	Fonda	C. D. Vonham	Sep'tr	Test.	311
707	Fonda	Rosebud	Ind.	A. T. Beswick	Fonda	Fonda	E. A. Haven	Sep'tr	Test.	7
708	Havelock.	Havelock.	Ind.	C. C. Clifton.	Havelock.	Havelock	C. C. Clifton	Sep'tr	Test.	
709	Laurens	Laurens Creamery	Ind.	W. & J. G. Hinn	Laurens.	Laurens.	F. W. Johnson.	Sep'tr	Test.	
710	Plover	Plover Creamery.	Ind.	John Carroll, Pres.	Howard, Ill.	Plover.	F. Wilson	Sep'tr	Test.	789
711	Pomeroy.	Breiholz Creamery	Ind.	E. C. M. Breiholz	Pomeroy.	....	Wm. Breiholz.	Sep'tr.	Test.	
712	Pomeroy	Bellville.	Ind.	B. Fisher	Pomeroy.	Pomeroy.	B. Fisher	Sep'tr	Hd.	
713	Rolfe.	Gilt Edge	Ind	W. R. Rogers	Rolfe.	....	E D. Rogers	Sep'tr	Test.	829
714	Rusk	Grant Creamery Co	Ind.	L. E. Hanson, Sec.	Rusk.	Pomeroy.	N. G. Nelson	Sep'tr	Hd.	
	Polk County.									
715	Ankeny	Crocker Center.	Ind.	McRae Bros.	Des Moines	Ankeny	W. R. Stewart	Sept'r	Test.	
716	Bondurant.	Farmers' Co-op. Cr'y As.	Co-op	B. F. Rathrock	Bondurant	Bondurant	A Gabrielson.	Sep'tr.	Test.	
717	Grimes.	Grimes B and C. Co	Stock.	W. J. Stewart, Sec.	Grimes.	Grimes.	G A. Stewart.	Sep'tr	Test	229
718	Maxwell	Keystone	Ind	F. W. Hill.	Maxwell	Maxwell.	A.K.Mendenh'll	S p'tr	Test.	235
719	Mitchellville.	Mitchellville Cr'y Ass'n	Co-op.	Wm. Prichards.	Mitchellville	Mitchellville	Geo. E. Roller	Sep'tr	Hd.	186
720	Runnells	Runnells B. and C. Co.	Co-op	W. L. Pence, Pres.	Runnells	Runnells	W. C Hurst.	Sep'tr	Test.	377
	Pottawattamie County.									
721	Avoca	Avoca.	Ind.	R. Frost.	Avoca	Avoca.	M. A. Lorensen	G C.		
722	Hancock.	Silver Valley.	Ind.	H. C. Brandes	Hancock.	Hancock	J. Doehla.	Sep'tr	Hd	261
723	Macedonia	Macedonia Cr'y Ass'n.	Stock.	J. M. Coans, Pres.	Macedonia	Macedonia	S M. Geyer	Sep'tr	Test.	

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Pottawattamie County—Continued.									
724	Minden	Minden.	Co-op.		Minden	Minden		Sep'tr	Test.	686
725	Treynor	Treynor Creamery Co.	Co-op.	Geo. Hurch	Treynor.	Council Bluffs.	F. O. Winchell.	Sep'tr	Test.	
	Poweshiek County.									
726	Barnes City	Barnes Creamery	Ind.	F. L. Emery, Sec.	What Cheer.	Barnes City	F. L. Emery	Sep'tr	Test	
727	Barnes City	sWhat Cheer Creamery	Ind.	Emery & Funk	What Cheer.			Sep'tr	Test.	
728	Brooklyn	Brooklyn	Ind.		Brooklyn	Brooklyn		Sep'tr	Test.	
729	Deep River	Deep River	Ind.	W. A. Negley	Deep River	Deep River		G. C.		
730	Grinnell.	Fowler.	Ind.	J. W. Fowler	Grinnell.	Grinnell.	J. W. Fowler	Sep'tr	Test.	197
731	Guernsey	Guernsey B. and C	Ind.	S. Whitney, Sec.	Toledo.	Guernsey.	A. L. Minehart.	Sep'tr	Test.	
	Ringgold County.									
732	Benton	Benton	Ind	Farwell & Bowlby.	Benton	Benton	F. B. Farwell.	Sep'tr	Hd.	
733	Knowlton	sElgin Creamery Co.	Ind.	O. Sands, Pres.	Chicago, Ill			Sep'tr	Test.	
734	Redding	Redding Creamery	Ind.	D. M. Rich	Redding.	Redding	D. M. Rich	G. C.		
735	Shannon City.	Union Creamery Co.	Co-op.	J. W. Hunter, Pres.	Shannon City	Shannon City	E.G Undermore	Sep'tr	Test.	121
	Sac County.									
736	Auburn	Auburn Creamery	Ind.	Dunahue & Ahrens.	Lake View	Auburn.	S. O. McCay.	Sep'tr	Test.	121
737	Carnarvon	Carnarvon Creamery	Ind.	Seaman & Hoon.	Carnarvon	Carnarvon.	D. J. Hoon	Sep'tr	Hd	122
738	Early	Delaware Center.	Co-op.	A. M. Morse, Sec.	Early	Early	A. J. Grotland.	Sep'tr	Test.	1,128
739	Early	Early	Ind.	G. W. Pattee	Early	Early	H. C. Best.	Sep'tr		337

740	Early	Gold Medal	Ind	J. W. Wright	Early	Lake View	J. W. Wright	Sep'tr	Test	191
741	Lake View	Lake View	Ind	Donahue & Ahren	Lake View	Lake View	J. Ericson	Sep'tr	Test	249
742	Odebolt	Odebolt	Co-op.	W. B. Umbarger, Mgr	Odebolt	Odebolt	E. McFarland	Sep'tr	Hd	683
743	Odebolt	Farmers' Creamery Co.	Stock	J. A. Cranston, Sec.	Odebolt	Odebolt	F. W. Sargent	Sep'tr	Test.	265
744	Odebolt	Stockholm	Ind	K. Mattson	Kiron	Odebolt	K. Mattson	Sep'tr	Hd.	
745	*Sac City	Blue Grass B. & C. Fac.	Ind	I. Hillman	Sac City	Sac City	F. Hillman	Sep'tr	Test.	
746	Sac City	Corn Valley	Ind	W. H. Pittis	Sac City	Sac City	W. H. Pittis	Sep'tr	Test.	
747	Sac City	Pearl	Ind	H. H. Underhill	Sac City	Sac City	M. R. Wright	Sep'tr	Test	227
748	Schaller	Eureka	Ind	O. F. Schrader	Schaller	Schaller	Geo. Bristoe	Sep'tr	Hd	381
749	Wall Lake	Wall Lake	Ind	Donahue & Ahren	Wall Lake	Wall Lake	T. Deacon	Sep'tr	Test	711
	Scott County.									
750	Amity	Amity	Ind	W. Koberg.	Amity	Davenport	W. Koberg	Sep'tr	Test.	
751	Donahue	Donahue F'm'rs B. Co.	Ind	Frank Keppy,	Donahue	Donahue	P. H. Kower	Sep'tr	Test	1,029
752	Eldridge	Eldridge B. and C. Co.	Ind	W. J Bryson	Eldridge	Eldridge	W. J. Bryson	Sep'tr	Test	276
753	Long Grove	Star	Ind	Geo. Curtis	Long Grove	Long Grove	J. H. Marriott	G. C.		
	Shelby County.									
754	Earling	Earling Creamery Co.	Ind	F. Theile, Sec	Earling	Earling	C. J. Pick	Sep'tr	Hd	
755	Westphalia	§Earling Creamery Co.	Ind	F. Theile, Sec	Earling			Sep'tr	Hd.	
756	Elk Horn	Danish Centrifugal	Ind	Geo James, Sec	Elk Horn	Brayton	P. K. Peterson.	Sep'tr	Test.	
757	Harlan	Harlan	Ind	C. Jorgenson	Harlan	Harlan	C. Jorgenson	Sep'tr.	Test.	
758	;Harlan	Buck Valley Creamery	Co-op.	R. Rasmussen, Sec.	Harlan	Kirkman	M. P. Henricksen	Sep'tr	Test	751
759	Walnut, Pottawattamie Co.	Prairie Rose	Co-op.	J. D. Lorentzen	Harlan	Walnut	N. C. Madren	Sep'tr	Test.	
	Sioux County.									
760	Alton	Alton	Ind	M. E. Mueller	Alton	Alton	M. E. Mueller	Sep'tr	Test	1,042
761	Granville	Northwestern Cr'y Co.	Stock.	C. Wagner	Granville	Granville	F. Koppe	Sep'tr	Hd.	

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§Skim Stations. *Manufactures both butter and cheese.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or stock company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle.
	Sioux County	*—Continued.*								
762	Hawarden	Hawarden Cr'y Ass'n	Co-op.	G. J. Shoemaker	Hawarden	Hawarden	G. A. Crowthen.	Sep'tr	Test	129
763	Hospers	Hospers Creamery	Co-op.	P. Jungers. Sec	Hospers	Hospers	F. U. Johnson	Sep'tr	Test.	
764	Hull	Hull	Ind	L. E. Bourquin	Hull	Hull	L. E. Bourquin	Sep'tr	Hd.	834
765	Rock Valley	The Rock Valley Cr'y	Ind	Stenscad Bros	Rock Valley	Rock Valley	J. Stenscad	Sep'tr	Hd.	757
766	Sioux Center	Welcome Creamery Co.	Ind	D. Rogeboom	Sioux Center	Sioux Center		Sep'tr	Hd.	749
767	Sioux Center	Sioux Center Creamery.	Ind	G. H Schoep	Sioux Center	Sioux Center	P. Westra	Sep'tr	Hd.	987
768	Sioux Center	†Sioux Center Creamery	Ind	G. H. Schoep	Sioux Center			Sep'tr	Hd.	
	Story County.									
769	Ames	Iowa Agri. College Cr'y		State of Iowa	Ames	Ames	Geo. L. McKay	Sep'tr	Test.	804
770	Ames	Milford Farmers' Cr'y	Co-op.	W. J. Gilmore, Sec	Ames	Ames	Wm. Young	Sep'tr	Test	866
771	Cambridge	Cambridge Far. Cr'y Co.	Co-op.	Oliver Hill, Sec	Cambridge.	Cambridge	J. R Moody	Sep'tr	Test	1,019
772	Collins	Farmers' Co-op. Cr'y	Co op.	A. G. Armstrong, Sec	Collins	Collins	A. G. Armstrong	Sep'tr	Test	629
773	Colo	Fairview	Ind	L M Kelley.	Colo	Colo	L. M. Kelley	Sep'tr	Test	614
774	Elwell	Highland Creamery Co.	Co-op	B J. Talbott, Sec	Elwell	Elwell	B. J. Talbott	Sep'tr	Test	
775	Gilbert Station	Gilbert Station Cr'y	Ind	T. B. Jones.	Gilbert Station	Gilbert.	P. Jensen	Sep'tr	Test	1,000
776	Huxley	Huxley Farmers' Cr'y	Co-op	J. Stenberg, Sec	Huxley.	Huxley.	J. F. Burrets	Sep'tr	Test.	
777	Iowa Center	Iowa Center	Ind	J. Q. Moore	Iowa Center	Maxwell	M. Mortenson	Sep'tr	Test	212
778	Maxwell	Maxwell	Ind	F. W. Hill	Maxwell	Maxwell	W. Peterson	Sep'tr	Test	233

779	McCallsburg...	McCallsburg Far. Cr'y..	Co-op.	F. Schawper, Pres...	McCallsburg...	McCallsburg...	E. S. Hoyt......	Sep'tr ..	Test..	240
780	Nevada........	Nevada...........	Ind...	Boardman Bros.....	Nevada........	Nevada	T. Russell	Sep'tr ..	Test.	
781	Roland	Indian Hill Creamery..	Stock.	R. Kimble, Pres....	Roland.........	Roland...... ..	John Baitinger.	Sep'tr ..	Test..	681
782	Roland.........	Roland Far. Cr'y Co....	Co-op.	E. J. Evenson, Sec..	Roland........	Roland........	R. Nelson	Sep'tr ..	Test..	43
783	Slater..........	The Slater Far. Cr'y Co.	Co-op.	Ole Langland, Sec..	Slater..........	Slater........ ..	John Freeland..	Sep'tr ..	Test.	
784	Story City......	Story City Far. Cr'y Co.	Co-op.	Carl Rasmussen....	Story City......	Story City......	W. H. Scheiber .	Sep'tr ..	Test..	720
	Tama County									
785	Berlin	Berlin Creamery........	Ind...	H.P.Jacobson & Bro.	Morrison.......	Berlin..........	O. P. Jacobson..	Sep'tr ..	Test.	
786	Chelsea	Chelsea	Ind...	Siegel & Son.........	Chicago, Ill....	Chelsea.......	Robert Allee....	G. C....	Test.	
787	Dysart.........	Dysart...	Ind...	O. O. Harrington....	Vinton	Dysart.........	E. O. Rowe......	G. C....	Test.	
788	Dinsdale.......	Dinsdale...............	Co-op.	E. Mitchell, Sec.....	Dinsdale.......	Dinsdale.......	O. E. Gaffin.....	Sep'tr ..	Test..	1,097
789	Gladbrook.....	Gladbrook.	Ind...	P. McNelly	Beaman.......	Gladbrook	Burton Owens..	S.& G.C.	Test.	
790	Montour.......	Montour................	Ind...	L. L. Johnson.......	Montour...	....	J. M. Lawyer...	G. C....	Test.	
791	Toledo.........	Toledo..................	Stock.	S. S. Whitney, Sec ..	Toledo.........	Toledo..........	Frank Skillin...	G. C....	Test.	
792	Traer..........	Traer.....................	Ind...	J. B. O'Connor......	Traer	Traer	J. B. O'Connor..	S.& G.C.	Test.	
	Taylor County.									
793	Bedford........	Bedford..................	Ind...	W. A. Geithman.....	Bedford........	Bedford........	W. A. Geithman	Sep'tr ..	Test.	
794	Blockton......	Blockton................	Ind...	H. H. Longwell......	Blockton.......	Blockton......	Fred Longwell..	Sep'tr ..	Test.	
795	Clearfield	Clearfield...............	Ind...	J. Dubet.............	Clearfield......	Clearfield......	G. U. McNair....	Sep'tr ..	Test..	699
796	Conway.	Blue Grass Creamery .	Stock.	M. C. Hall, Sec	Conway	Conway........	Frank Ketch....	Sep'tr ..	Test.	
797	Conway	*s* Elgin Creamery Co....	Ind...	O. Sands, Pres.......	Chicago, Ill. ..	....	....	Sep'tr ..	Test.	
798	Guss...........	Cold Spring Creamery..	Co-op.	H. B. Moats, Sec....	Guss...........	Corning	W. A. Liebhardt	Sep'tr ..	Test.	
799	Guss..	Maple Grove	Ind...	E. Schoonover.......	Guss...........	Nodaway	E. Schoonover ..	G. C....	....	1,135
800	Lenox	*s* Elgin Creamery Co...	Ind...	O. Sands, Pres.......	Chicago, Ill....	....	....	Sep'tr ..	Test.	

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s Skim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred	Dairy commissioner's test-bottle number.
	Union County.									
801	Afton	Elgin Creamery Co	Ind	O. Sands	Chicago, Ill	Afton	J. W. Kelley	Sep'tr	Test	771
802	Dodge	*s*Elgin Creamery Co	Ind	O. Sands	Chicago, Ill	Afton		Sep'tr	Test.	
803	Lincoln	*s*Elgin Creamery Co	Ind	O. Sands	Chicago, Ill	Afton		Sep'tr	Test.	
804	Pleasant	*s*Elgin Creamery Co	Ind	O. Sands	Chicago, Ill	Afton		Sep'tr	Test.	
805	Thayer	*s*Elgin Creamery Co	Ind	O. Sands	Chicago, Ill	Afton		Sep'tr	Test.	
806	Arispee	Farmers'Co-op CryAssn	Co-op.	S. Clough, Jr., Sec	Arispee	Arispee	H. L. Case	Sep'tr	Test	996
807	Creston	Elgin Creamery	Ind	O. Sands.	Chicago, Ill	Creston	R. H. Fairfield	Sep'tr	Test.	722
808	Cromwell	*s*Elgin Creamery	Ind	O. Sands	Chicago, Ill			Sep'tr	Test.	
809	Kent	*s*Elgin Creamery	Ind	O. Sands	Chicago, Ill			Sep'tr	Test.	
810	Lorimor	Elgin Creamery	Ind	O Sands	Chicago, Ill	Lorimor	Geo. Beckman	Sep'tr	Test	637
811	Talmage	Talmage Creamery Co.	Stock	J. W. Bebee, Sec	Talmage	Talmage	J. W. Alexander	Sep'tr	Test	352
812	Pleasant	*s*Talmage Creamery Co.	Stock.	J. W. Bebee, Sec	Talmage.			Sep'tr.	Test.	
813	Dodge	*s*Talmage Creamery Co.	Stock.	J. W. Bebee, Sec	Talmage			Sep'tr	Test.	
	Van Buren County.									
814	Cantril	Cantril B. and C. Co	Stock.	A. P. DeFord, Sec	Cantril	Cantril	Gus Schwanke	S.& G.C.	Test.	
815	Milton	Milton	Ind	Woodword & Cooley	Milton	Milton	V. T. Cooley	G. C.		
816	Stockport	*s*Fairfield	Ind	John McLane	Fairfield, Jefferson county			Sep'tr	Test.	
	Wapello County.									
817	Agency	Agency B. and C. Co	Ind	John Engert	Agency	Agency	O. E. Perkins	Sep'tr	Test.	

818	Blakesburg	Blakesburg Creamery	Ind	A. E. Nelson	Blakesburg	Blakesburg	A. E. Nelson	Sep'tr	Test.	
819	Eldon	Eldon	Ind	C. E. Mortenson	Eldon	Eldon	C. E. Mortensen.	Sep'tr	Test.	
820	Kirkville	Kirkville	Ind	Z. S. Hain	Oskaloosa	Kirkville	H. E. Ross	Sep'tr	Test.	
821	So. Ottumwa	South Ottumwa Cr'y	Ind	E. C. McKimmey	So. Ottumwa	Ottumwa	J. G. Meyers	Sep'tr	Test.	683
	Warren County.									
822	Lacona	Lacona	Ind	F. W. Shupe	Lacona	Lacona	F. W. Shupe	Sep'tr	Test.	
823	Milo	Warren County	Ind	E. Haldman	Humeston	Humeston		Sep'tr	Test.	
824	Norwa k	Norwalk Creamery	Ind	G. Morrow, Sec	Des Moines	Norwalk	James Wright	Sep'tr	Test.	
825	Prole	Prole	Ind	E. H. Perkins	Prole	Prole	J. Wiley	Sep'tr	Test.	
	Washington County.									
826	Kalona	Kalona	Ind	Wm. Brooks & Son.	Kalona	Kalona	Wm. Brooke	Sep'tr	Test.	
827	Noble	Oak Ridge	Ind	E. Jenkin, Mgr	Noble	Noble	E. Jenkin	Sep'tr	Test.	993
828	Riverside	Riverside	Ind	E. Nichols	Riverside		Wm. Miles	G C.		
829	Washington	Washington	Ind	Hise Bros	Washington	Washington	A. Viking	Sep'tr	Test.	876
830	Wellman	Daytonville	Ind	C. O. Nicholas	Wellman	Wellman		Sep'tr	Test	883
	Wayne County.									
831	Allerton	Allerton	Ind	I A. Halderman	Allerton	Allerton	M. Rasmussen	Sep'tr	Test.	622
832	Humeston	Wayne County Cr'y	Ind	T. G. Hyde, Mgr.	Humeston	Humeston	T. G. Hyde	Sep'tr	Test.	664
833	Humeston	*s* Wayne County Cr'y	Ind	T. G. Hyde, Mgr.	Humeston			Sep'tr	Test.	
834	Lewisburg	*s* Wayne County Cr'y	Ind	T. G. Hyde, Mgr.	Humeston			Sep'tr	Test.	
835	Cambria	*s* Wayne County Cr'y	Ind	T. G. Hyde, Mgr.	Humeston			Sep'tr	Test.	
836	Seymour	Seymour Creamery	Ind	B. S. Parker	Seymour	Seymour	H. Brohaw	Sep'tr	Hd.	727
	Webster County.									
837	Badger	Badger Creamery.	Ind	G. W. Gillman	Badger	Badger	G. W. Gillman	Sep'tr	Test.	288
838	Dayton	Willow Brook	Ind	J. M. Daniels	Dayton		M. Larson	G C		218
839	Duncombe	Duncombe	Ind	Clelland Bros	Duncombe	Duncombe	Wm. Clelland	Sep'tr	Test.	

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s Skim Stations.

IOWA CREAMERY LIST—CONTIUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Webster County—Continued.									
840	Gowrie	Gowrie	Ind	F. S. Davis	Gowrie	Gowrie	Geo. Holtsclaw.	G. C.		
841	Moorland	Moorland	Ind	S. J. Skinner	Moorland	Moorland	S. J. Skinner	Sep'tr	Test.	132
842	Vincent	Vincent	Co-op.	W. H. Woolsey	Vincent	Vincent		Sep'tr	Test.	
	Winnebago County.									
843	Amund	Eden Co-operative Cr'y	Co-op.	D. Skuttle, Sec	Amund	Thompson	I J. Erdal	Sep'tr	Test.	
844	Forest City	Forest City Creamery	Co-op.	I. J. Kessey	Forest City	Forest City	Lewis Richard	S.& G.C.	Test.	
845	Forest City	sForest City Creamery.	Co-op.	I. J. Kessey	Forest City	Forest City		S.& G.C.	Test.	
846	Lake Mills	Winnebago & North Creamery	Co-op.	Ole T. Grove	Lake Mills	Lake Mills	Ben Nelson	Sep'tr	Test.	269
847	Lake Mills	sWinnebago & North Creamery	Co-op.	Ole T. Grove	Lake Mills			Sep'tr	Test.	
848	Lake Mills	Logan Butter Factory	Co-op.	John J. Lande	Lake Mills	Lake Mills	J. M. Tapager	Sep'tr	Test.	
849	Lake Mills	sLogan Butter Factory.	Co-op.	John J. Lande	Lake Mills			Sep'tr	Test.	
850	Mt. Valley	sMt. Valley Creamery	Co-op.	J. T. Tallekson	Fertile	Fertile		Sep'tr	Test.	
851	Norman	Norman Cr'y Ass'n	Co-op.	S. G. Honsy	Norman	Norman	N.N.Engbretson	Sep'tr	Test.	1,182
852	Norman	sMoen	Co-op.	S. G. Honsy	Norman			Sep'tr	Test.	
853	Thompson	Thompson Co-op.	Co-op.	S. Higenbothum	Thompson	Thompson	M. M. Tapager	Sep'tr	Test.	
854	Thompson	sThompson Co-op	Co-op.	S. Bigenbothum	Thompson			Sep'tr	Test.	
	Winneshiek County.									
855	Burr Oak	Silver Creek	Co-op.	C. E. Reed	Burr Oak	Decorah	C. E. Reed	G. C.		

856	Canover	Crystal Springs	Ind	C. E. Wood, Mgr.	Canover	Canover	L. Lyman	Sep'tr	Test.	624
857	Castalia	Castalia Farmers' Cr'y.	Co-op.	H L Mayne, Sec.	Castalia	Castalia	Wm. Albright	Sep'tr	Test.	
858	Hesper	Anchor	Ind	J. H. Miller	Hesper	Mable	E. Halsey	G. C.	Test.	
859	Highlandville.	Kjomere Spring	Ind	N. N. Larson	Highlandville.	Mable	N. N. Larson	G. C.		
860	Nordness	Nordness Creamery Co.	Stock.	J. J. Running	Nordness	Nordness	Geo. H. Thune	G. C.		
861	Nordness	Red Oak	Co-op.	O. G. Hauger, Sec.	Nordness	Nordness	Erik Clement	G. C.		
862	Ossian	Washington Prairie	Ind	E. G. Opdahl	Decorah	Ossian	P. O. Nasse	G. C.	....	159
	Winneshiek County.									
863	Ossian	Scheidmantle Cr'y	Ind	Scheidmantle Bros.	Ossian	Ossian	Will Speicher	S. & G.C.	Test.	
864	Ridgeway	Lincoln Farmers' Co-op.	Co-op.	J. Paley, Sec.	Ridgeway	Ridgeway	G. A. Baker	G. C.	Test.	
865	Ridgeway	Ridgeway Creamery	Ind	C. A. Fosse, Sec.	Ridgeway	Ridgeway	L. F. Fasse	S. & G.C.	Test.	
866	Spillville	Spillville Cr'y Co	Ind	J. A. Dostal	Spillville	Conover	J. A. Dostal	G. C.	Test.	315
	Woodbury County.									
867	Anthon	Anthon Cr'y Co	Ind	G. A. Brown,	Anthon	Anthon	G. H. Fuller	Sep'tr	Test.	
868	Climbing Hill.	Climbing Hill	Ind	De Witt Goodrich	Climbing Hill.	Luton	D'WittGoodrich	Sep'tr	Test.	
869	Cushing	Cushing	Ind	John Wilson Co.	Cushing	Cushing	J. Wilson	Sep'tr	Hd.	
870	Oto	Oto Creamery	Ind	Welch & Smith	Oto	Oto	J. H. Schrum	Sep'tr	Test.	
871	Smithland	Smithland	Ind	T. H. Smith	Rodney	Smithland	....	Sep'tr	Hd.	
872	Sioux City	Sioux City Cr'y Co	Ind	F. J. Glenn	Sioux City	Lude	E. C. Gure	Sep'tr	Hd.	
	Worth County									
873	Bristol	sNorman Creamery	Co-op.	S. E. Honsey	Norman	Norman	....	Sep'tr	Test.	
874	Fertile	Fertile Co-op. Dairy	Co-op.	B. G. Richardson	Fertile	Manly	J. A. Johnson	Sep'tr	Test.	
875	Grafton	Grafton Cr'y Ass'n	Ind	M. Buehrer	Grafton	Grafton	T. H. Eckstein	S. & G.C.	Test.	723
876	Kensett	Kensett Creamery	Ind	Chas. Watson	Kensett	Kensett	C. Watson	G. C.	Test.	198
877	Lake Mills	Nordland	Co-op.	F. L. Lee, Pres	Nordland	Kensett	H. Gulbranson.	Sep'tr	Test.	738
878	Manly	F'm'rs Co-op. Cr'y Ass'n	Co-op.	A. E. Mellen, Sec.	Manly	Manly Junct'n	H. Knowles	G. C.	Test.	242

sSkim Stations.

IOWA CREAMERY LIST—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CREAMERY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY, OR MANAGER.	P. O ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF BUTTER-MAKER.	Separator, gathered cream, or both.	Method of receiving milk—by the test, or by the hundred.	Dairy commissioner's test-bottle number.
	Worth County—Continued.									
879	Northwood	Brookfield Cr'y Ass'n	Co-op.	J. B. Thompson	Northwood	Northwood	N. C. Siveling	Sep'tr	Test	758
880	Northwood	Hartland Creamery	Co-op.	Ole N. Grefshein	Silver Lake	Northwood	Nils Dahlen	Sep'tr	Test	804
881	Northwood	Farmers' B. and C. Assn	Co-op	L. G. Mellen, Sec	Northwood	Northwood	J. Siverling	Sep'tr	Test.	
882	Northwood	Tenold Cr'y Ass'n	Co-op.	O. G. Anderson, Sec.	Tenold	Northwood	Wm. Thyheson.	Sep'tr	Test.	
	Wright County.									
883	Belmond	Norway Cr'y Co-op	Co-op.	G. Alexander, Pres.		Belmond	——— Channer	Sep'tr	Test.	
884	Belmond	Belmond Creamery Co.	Stock.	H. J. Klemme, Sec.	Belmond	Belmond	G. Wendworth	Sep'tr	Test.	
885	Clarion	Clarion Creamery	Ind	J. D. Dennison	Clarion	Clarion	J. Dennison	S. & G.C	Test.	
886	Eagle Grove	Eagle Grove Creamery.	Ind	S. Middleton	Eagle Grove	Eagle Grove	S. Middleton	S & G.C.	Test.	
887	Florence	Florence Co-op	Ind	W. E. Henley, Pres	Clarion	Florence	H. Granseth	Sep'tr	Test.	
888	Goldfield	Fountain B. & C.	Ind	B. P. Scott	Goldfield	Goldfield	B. P. Scott	Sep'tr	Test.	
889	Go'dfield	McMurty Bros	Ind	McMurty Bros	Goldfield.	Goldfield	J. Campbell	Sep'tr	Test.	
890	Drew	*s*McMurty Bros	Ind	McMurty Bros	Goldfield	Goldfield.		Sep'tr	Test.	
891	Rowan	Rowan Creamery Co	Co-op.	E Ballar, Pres	Rowan	Rowan	E. V. Campbell.	Sep'tr	Test.	628

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s Skim stations.

THE CHEESE INDUSTRY IN IOWA.

Little advancement can be noted in the development of the cheese branch of the dairy industry of our state, as far as shown by the manufacture of the product—in fact, this feature may be considered at a stand-still, with indications of a backward movement. While creameries are on the increase, to an extent far beyond previous records, we find but four additional cheese factories reported over the previous year, and the output less than that for the same period of the previous year. The consumption of cheese throughout our state is on the increase, and should be an incentive for the production of this article in Iowa on a much larger scale. That the consumption of cheese has been largely increased through the efforts of state and national legislation, is recognized by the wholesale and retail dealers. The national filled-cheese law, placing artificial cheese under similar regulations to those of oleomargarine, has materially assisted in freeing our state from filled cheese, which in turn has been replaced by an honest article, that is both palatable and wholesome, to the end that the consumption of cheese in Iowa has more than doubled since the law became effective, July 1, 1896. The failure to develop the production of cheese, therefore, must be from some cause other than lack of demand. Both cheese and butter are the products of milk. Contrast the difference in the development of these industries: Butter, in addition to supplying our 2,225,000 people, is exported to an amount nearly equal to 100.000,000 pounds annually; while with cheese, the total annual make by factories in Iowa is less than 4,000,000 pounds, and where an export should be made large importations are necessary to supply the demand at home, thereby exhausting, rather than adding to, the resources of Iowa in this respect. The conditions that make the production of butter in Iowa surpassed by no other section in quality and reduced cost, should also apply to the production of cheese, providing the industry is developed to an extent corresponding with that of the leading cheese producing sections of our country. The cheapness and abundance of feed, together with the local demand for a good article, would enable the production and sale at prices that would afford a profit more than that obtained by those who are now engaged in supplying the greater portion of the cheese now marketed in our state. Investigation has developed the fact that much grain and other feed is being constantly shipped from Iowa to the eastern states, and there converted into cheese through the medium of the cow, pastured and maintained upon high-priced land. It is further developed that much of this cheese is marketed in Iowa. Thus the fertility of the soil—and that is practically the only value there is in farm land—is shipped by piecemeal and made to keep up the productiveness of the eastern farm, and by these transactions our people pay the freight both ways when we buy our cheese from them. How long and to what extent this can be continued is a question for our farmers to decide.

Statistics pertaining to the cheese industry of our state have been sought for in the same manner as those of the creamery, but with much less satisfaction. The comments pertaining to the reports from creameries, as previously made in this report, are equally as true as to those who are conducting cheese factories. The following is the reprint of the blank used for the year 1897 by cheese factories in making a report to this department, and the cheese factory list and Tables Nos. 12 and 13 were compiled from answers received.

CHEESE FACTORY REPORT.

1. Name of cheese factory..
2. Cheese factory located at or near what town?........................
   Cheese factory located in what county?...............................
   a Postoffice where factory mail is received?............County?......
   b Shipping station?...............On what railroad?...............
3. What is a fair valuation of plant? $...............When was factory built? 18..........
4. Is cheese factory operated by individual or firm?....... ....
   a Is factory operated by farmers' co-operative association?...........
   b Is factory operated by a stock company on the co-operative plan?....
   c Is factory operated by a stock company where by-laws provide for annual or semi-annual dividends on stock?...............................
   d Is factory operated by owner?...If not, from whom is it leased?.....
5. Name of present proprietor or firm?...
   Postoffice address?..
   a Name of president or secretary?......................................
   Postoffice address?..

b If cheese factory has changed ownership within the past year, state name of former owner or owners?..........................

c If cheese factory was formerly operated as a creamery or skim station, state by whom operated and when change was made?........ When changed?..................

6. Has the factory an official dairy commissioner's test bottle?........... Number engraved on same?....................................

7. State number of separators in use?..............Give name of each, and whether turbine or belt? Name of separator?...............

8. If a milk tester is used, give name of tester and also name of manufacturer? Name of tester?..............Manufacturer.............

9. Did you manufacture butter during any part of the year ending May 1, 1897?...............

a Do you contemplate manufacturing butter during any part of the year ending May 1, 1898?.................

10. State by the word "yes" after each question asked below, the plan used in receiving milk and cream:

a Is the milk received on the relative value plan (by test)............

b By the hundred or pool plan?.............

11. Was the cheese factory operated the entire year ending May 1, 1897?.. If not operated the entire year, check the month or months the factory was closed:

1896—May June July August September October November December

1897—January February March April

12. Name of head cheese-maker?

a When one of the firm, give full name? ....

b Has cheese-maker taken a course in dairying at a dairy school....... If so, where?...

c Monthly wages, price per pound paid head cheese-maker for year, or any part of the year, ending May 1, 1897:

During winter months?.......During summer months?.......

d If uniform, state amount for the entire year, or any part thereof: $..

e Monthly wages paid first helper?..................Number months employed?...............

13. State the average number of persons other than patrons employed in collecting milk?..................

a State yearly expense of collecting milk? $.............

14. Give number of pounds of milk received and made into cheese from May 1, 1896, to May 1, 1897.....................

(In case cheese factory was not operated the entire year, answer question for time during the year cheese factory was operated.)

a State the average per cent of butter fat and the average pounds of cheese made per 100 pounds of milk for each month of the year ending May 1, 1897.

(Answer both questions if possible; if not, answer the one of which you have a record.)

1896.—May ....per cent butter fat; ....pounds cheese made
June ....per cent butter fat; ....pounds cheese made
July...........per cent butter fat; ....pounds cheese made
August.........per cent butter fat; ....pounds cheese made

1896.—September ......per cent butter fat; ....pounds cheese made
October ....per cent butter fat; ....pounds cheese made
November.......per cent butter fat; ....pounds cheese made
December.......per cent butter fat; ....pounds cheese made
1897.—January ....per cent butter fat; ....pounds cheese made
February........per cent butter fat; ....pounds cheese made
March...........per cent butter fat; ....pounds cheese made
April............per cent butter fat; ....pounds cheese made
Yearly average........per cent butter fat; ....pounds cheese made

15. State the average yearly cost per pound of manufacturing cheese, including the cost of package but not the cost of delivering milk? ....cents per pound?

a Give the number of net pounds and kinds of cheese manufactured from May 1, 1896, to May 1, 1897, or part of the year operated, as enumerated below: Number pounds of cheddar?..............lbs. Limburger?..............lbs. Swiss? ....lbs. Number pounds brick?................lbs. Pounds and kinds of other cheese?...............lbs. Total?..............lbs.

b Give the estimated cash value of all cheese manufactured from May 1, 1896, to May 1, 1897, or part of the year operated, after deducting the expense of shipping and selling? $...............

16. What part or per cent of this cheese was furnished to patrons?........

a What part or per cent of this cheese was marketed for consumption in Iowa?..............

b What part or per cent of this cheese was shipped to points outside of the state?.................

17. Give the number of persons patronizing the cheese factory from May 1, 1896, to May 1, 1897, or part of year operated?.................

18. Estimate the number of cows comprising the herd of the average patron of your factory?..

(Please take extra pains to get information so as to answer this question.)

19. If there are any new cheese factories, creameries, or skim stations in your county, opened since November 1, 1896, state where they are located and give proprietor or manager:

Name.......................P. O. address.....................
Name.......................P. O. address.....................
Name.......................P. O. address.....................
Name.......................P. O. address.....................

20. If there are any old cheese factories, creameries, or skim stations reopened in the past year in your county, give location and by whom operated:

Name.......................P. O. address.....................
Name.......................P. O. address.....................

21. Give the names of any cheese factories, creameries, or skim stations in your county having burned since November 1, 1896, giving causes when known?..

Has the cheese factory or creamery been rebuilt?................

22. Give the amount and value of all coal used in your factory during the year ending May 1, 1897, or part of year operated:

Number tons?..................Value? $..................

a State what per cent or amount of this coal was domestic (mined in Iowa):
Number of tons or per cent?..............Value? $..............

b State what per cent or amount was foreign (mined outside of Iowa)?..

c If quality, cost at mine or freight rates cause preference for foreign coal, state which; also other reasons, if any?....................
....

W. K. Boardman, State Dairy Commissioner:

DEAR SIR—Herewith find a report of the..................cheese factory for the year ending May 1, 1897. Respectfully,

....
(Prop., Sec., or M'gr.)

The office record number of this factory for 1896, is..................

NOTE.—Kindly give this your immediate attention. Stamped and addressed envelope enclosed.

In table No. 12 we gather the following summary and conclusions: There were in operation November 1, 1897, 75 cheese factories, operated in 41 counties. This is an increase of four factories over the previous year. Nine of the factories manufacture butter at some season of the year. Of the total number of factories, 57 have individual or proprietary management, 7 have co-operative management and 11 are stock companies. Seventeen factories receive milk on the test plan, and 58 by weight. From the best of authorities it is claimed that in the manufacture of cheese the quality of milk as regards butter fat affects not only the richness but also the quantity of cheese that a given amount of milk will produce, for the reason that an increase in the fat contents of milk is accompanied by an increase in the other cheese-producing solids. If this be admitted, the importance of adopting the test plan in receiving milk should be apparent. While our creameries are almost universally adopting this system, we find that the cheese factories are still largely adhering to the plan of receiving by weight only. The benefit and equality derived from the test system may not be so marked when cheese is the object as in the manufacture of butter, but the question of justice still exists, and the encouragement of a better quality of milk would best be promoted in the adoption of the test plan. Forty-two factories report on the number of months operated during the year. Fifteen were in operation 12 months, 20 less than 12 months but more than 6, and 7 less than 6 months. The average time of operating for the 42 factories reporting was 8 months. The fact that cheese factories as a class do not operate the entire year is one reason, no doubt, that has retarded the establishment of more factories. But this feature might be overcome by having more of our creameries constructed so as to manufacture cheese during the summer and fall months, when the quantity of milk is large and the price usually low. Thirty-six factories report the number of patrons to be 1,198, which is about 31 to each factory, or 2,325 for the 75 factories. This is an increase of 270 patrons. Thirty-three cheese factories report 9,467 cows, or 287 cows per factory. This is an average of 9.2 cows per patron, and a total for the 75 factories of 21,475. A slight decrease in the number of cows, and a decrease of over 1 each in the number of cows per patron.

TABLE No. 12.

Iowa Cheese Factories—Showing total number of cheese factories, how, and number of months operated during year ending May 1, 1897; also number of persons employed, number patrons and number cows, together with average for each county.

COUNTIES.	TOTAL NUMBER OF CHEESE FACTORIES, SHOWING NUMBER INDIVIDUAL, CO-OPERATIVE, AND STOCK COMPANIES.					TOTAL NO. RECEIVING MILK BY THE TEST OR CWT.			NUMBER OPERATED ENTIRE YEAR; NUMBER LESS THAN A YEAR; AVERAGE NUMBER OF MONTHS.					TOTAL NUMBER PERSONS EMPLOYED IN FACTORIES.					NUMBER OF PATRONS FURNISHING MILK.		NUMBER COWS PRODUCING MILK DELIVERED TO FACTORIES, WITH AVERAGE NUMBER COWS PER FACTORY.		
	Tot'l No. cheese factories.	No. factories reported.	Individual.	Co-operative.	Stock company.	No. factories reported.	By test.	By the hundred pounds.	No. factories reported.	Twelve months	Six months or more.	Less than six months.	Average number months.	No. factories reported.	Cheese-makers.	Assistants.	Collecting milk	Total number employed	No. factories reported.	Number patrons.	Number reported.	Number cows.	Average number cows per factory.
The state	76	76	57	7	11	75	17	58	42	15	20	7	8.0	40	40	13	....	53	36	1,198	33	9,467	287
Appanoose	4	4	1	...	3	4	....	4	4	1	2	1	8.0	4	4	..	...	4	4	95	4	895	228
Benton	3	3	3	....	....	3	....	3	1	1	....	....	12.0	1	1	....	....	1	1	60	1	600	600
Black Hawk	2	2	2	....	....	2	2	....	2	...	2	....	8.0	2	2	2	....	4	2	90	2	810	405
Bremer	1	1	1	....	....	1	1	....	1	1	....	....	12.0	1	1	1	....	2	1	120	....	......	......
Calhoun	1	1	..	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....	......	....	......	......
Cedar	1	1	1	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	......	....	......	......
Cerro Gordo	1	1	1	....	....	1	..	1	1	....	....	1	5.0	1	1	1	...	2	1	17	1	306	306
Clarke	1	1	1	....	....	1	1	....	1	...	1	....	11.0	1	1	1	..	2	..	......	...	......	.....
Crawford	1	1	1	....	..	1	....	1	...	...	...	....	....	....	....	....	....	....	....	......	....	......	......
Dallas	1	1	1	....	..	1	1	1	1	....	1	....	7.0	1	1	....	....	1	....	......	....	......	......
Davis	1	1	...		1	1	1	....	....	....	....	....	....	....	....	....	...	....	....	......	....	......	......
Decatur	1	1	1	....	...	1	....	1	....	....	...	....	....	....	....	....	....	....	....	......	...	......	......
Floyd	2	2	1	....	1	2	....	2	1	1	...	....	12.0	1	1	1	...	2	1	60	1	480	480
Franklin	1	1	1	....	....	1	....	1	1	....	1	....	7.0	1	1	....	...	1	...	......	....	......	.....
Greene	1	1	1	....	....	1	1	..	..	....	...	....	....	....	....	....	...	....	....	......	....	......	......
Guthrie	1	1	1	....	....	1	..	1	1	....	1	....	9.0	1	1	1	....	2	1	60	1	480	480
Grundy	1	1	1	....	....	1	....	1	1	1	....	....	12.0	1	1	1	...	2	1	60	....	......	.....
Hardin	2	2	1	...	1	2	...	2	1	....	..	1	5.0	1	1	....	....	1	....	......	....	......	......
Humboldt	2	2	2	..	....	2	....	2	3	....	1	2	6.0	2	2	....	....	2	3	30	3	300	100
Howard	4	4	3	.	1	4	....	4	1	1	..	....	....	....	...	....	...	....	....	......	....	......	......
Johnson	2	2	1	1	....	2	..	2	2	..	2	....	7.5	2	2	1	...	3	2	43	2	645	322
Jones	2	2	2	....	....	2	1	1	1	....	1	....	6.0	1	1	1	..	2	..	......	...	......	......
Keokuk	2	2	1	....	1	2	....	2	1	....	1	...	9.0	1	1	1	....	2	1	60	1	480	480

TABLE No. 12.—CONTINUED.

COUNTIES.	TOTAL NUMBER OF CHEESE FACTORIES, SHOWING NUMBER INDIVIDUAL, CO-OPERATIVE, AND STOCK COMPANIES.					TOTAL NO RECEIVING MILK BY THE TEST OR CWT.			NUMBER OPERATED ENTIRE YEAR; NUMBER LESS THAN A YEAR; AVERAGE NUMBER OF MONTHS.					TOTAL NUMBER PERSONS EMPLOYED IN FACTORIES.					NUMBER OF PATRONS FURNISHING MILK.		NUMBER COWS PRODUCING MILK DELIVERED TO FACTORIES, WITH AVERAGE NUMBER COWS PER FACTORY.		
	Tot'l No. cheese factories.	No. factories reported.	Individual.	Co-operative.	Stock company.	No. factories reported.	By test.	By the hundred pounds.	No. factories reported.	Twelve months	Six months or more.	Less than six months.	Average number months.	No. factories reported.	Cheese-makers.	Assistants.	Collecting milk	Total number employed.	No. factories reported.	Number patrons.	Number reported.	Number cows.	Average number cows per factory.
Lee	2	2	2	....	....	2	....	2	2	1	1	....	10.5	2	2	1	....	3	2	50	2	600	300
Linn	2	2	2	....	....	2	....	2	....	....	....	....	......	....	....	....	....	....	....	....	....	......	......
Marshall	1	1	.	1	....	1	1	....	....	....	....	....	....	..	.	....	....	..	....	......	.	....	......
Montgomery	2	2	2	..	....	2	...	2	....	..	....	...	...	..	....	...	....	....	.	......	..	......	......
Monroe	11	11	10	1	1	11	....	11	8	3	4	1	9.0	8	8	....	....	8	8	130	8	1,300	162
Muscatine	1	1	1	....	....	1	...	1	....	....	..	..	......	..	....	...	..	....	..	......	....	....	......
Page	1	1	1	....	....	1	....	1	1	.	...	1	4.0	1	1	.	...	1	1	20	....	....	......
Poweshiek	8	8	8	..	....	8	8	....	2	2	....	...	12.0	2	2	....	..	2	2	71	2	1,228	604
Ringgold	1	1	....	1	....	1	....	1	1	.	1	..	7.0	1	1	..	....	1	1	27	1	108	108
Sac	2	2	2	..	....	2	1	1	1	1	....	...	12.0	1	1	1	....	2	1	30	1	360	360
*Story	1	1	...	....	....	1	1	....	....	....	....	..	......	....	...	....	....	....	..	......	..	......	......
Taylor	1	1	1	....	...	1	....	1	1	1	....	...	12.0	1	1	....	....	2	1	50	1	400	400
Van Buren	1	1	1	..	....	1	....	1	....	....	..	....	.....	....	...	....	....	....	..	......	..	......	.....
Washington	3	3	...	3	....	3	1	2	1	...	1	....	8.0	1	1	....	....	1	1	25	1	75	75
Wapello	1	1	1	..	....	1	....	1	....	....	..	....	..	.	..	..	....	..	..	......	..	......	......
Warren	1	1	1	....	....	1	...	1	1	1	..	....	12.0	1	1	....	....	1	1	100	1	400	......
Winnebago	1	1	..	....	1	1	...	1	....	....	....	...	..	...	....	....	...	....	....	......	....	......	......
Wayne	2	2	2	..	.	2	....	2	....	...	....	....	.. .	.	...	...	....	....	....	......		... .	......
Total	76	76	67	7	11	75	17	58	43	15	20	7	8.0	40	40	13	...	53	36	1,198	33	9,467	287

*This factory is the property of the state of Iowa, located at Ames, and operated in connection with the creamery at Ames.

From Table No. 13, 44 cheese factories report their value as $77,050, which is an average of $1,760 per factory, or a value of $132,000 for the 75 factories. Thirty-nine factories report the number of pounds of milk received for the year ending May 1, 1897, to be 22,708,529 pounds, which is an average of 582,270 pounds per factory, or 43,670,250 pounds for the 75 factories. Thirty-seven report the amount of cheese manufactured for the same length of time 2,202,223 pounds, or 59,519 pounds per factory, and taking this as a basis would figure 4,463,946 pounds for the 75 factories. This shows that it required 9.5 pounds of milk for each pound of cheese manufactured. As to the disposition of the above, about three-fourths was disposed of in Iowa, and one-fourth was shipped to points outside the state. Twenty-one factories report the number of tons of coal used to be 450. This would make the total used by 75 factories, 1,575 tons.

TABLE No. 13.

Iowa Cheese Factories—Showing value of plants, pounds of milk received, kinds and number of pounds of cheese manufactured and disposition of same for the year ending May 1, 1897.

COUNTY.	TOTAL NUMBER AND VALUE OF ALL PLANTS.			TOTAL POUNDS OF MILK RECEIVED FROM MAY 1, 1896, TO MAY 1, 1897.			TOTAL POUNDS OF CHEDDAR AND YOUNG AMERICA CHEESE, POUNDS OF SWISS, LIMBURGER AND OTHER KINDS NOT NAMED, AND TOTAL POUNDS OF ALL CHEESE MANUFACTURED DURING THE YEAR ENDING MAY 1, 1897.						TOTAL POUNDS OF CHEESE SOLD OR CONSUMED IN IOWA AND POUNDS SHIPPED OUT OF STATE.			TOTAL TONS COAL USED DURING YEAR.	
	Number cheese factories.	Number reporting.	Value.	Number receiving milk.	Number reported.	Total pounds of milk received.	Number reporting.	Total pounds cheddar and Young America.	Total pounds Swiss.	Total pounds limburger.	Total pounds cheese not named.	Total of all cheese manufactured.	Number reporting.	Pounds sold in Iowa.	Pounds shipped out of state.	Number reporting.	Number tons.
The state	76	44	$77,060	76	39	23,708,529	37	1,583,918	20,100	6,000	436,070	2,202,223	36	1,585,131	417,292	21	450
Appanoose	4	4	1,850	4	3	1,202,581	3	....	....	....	132,306	132,306	3	85,506	46,800	3	31
Benton	3	3	8,500	3	1	1,214,887	1	116,000	....	....	....	116,000	1	116,000	....	1	25
Black Hawk	2	2	7,800	2	2	1,834,960	2	183,497	....	....	....	183,497	2	147,978	35,519	....	....
Humboldt	2	2	1,400	2	3	720,000	3	26,700	20,100	6,000	....	52,800	2	31,980	20,820	1	4
Jones	2	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....
Johnson	2	2	5,500	2	2	555,470	1	....	....	....	....	46,535	1	23,267	23,268	1	35
Lee	2	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....
Linn	2	1	2,000	2	2	878,175	2	61,525	....	....	....	61,525	2	57,369	4,156	2	10
Monroe	11	10	6,350	11	9	2,505,469	8	174,979	....	....	40,015	214,994	8	214,994	....	3	31
Poweshiek	3	2	6,000	3	2	2,722,351	2	210,894	....	....	....	210,894	2	210,894	....	2	100
Wayne	2	2	5,950	2	2	1,987,068	2	197,000	....	....	....	197,000	2	45,873	151,127	....	....
Bremer	40	16	32,100	40	13	9,688,068	13	613,123	....	....	263,749	986,873	13	651,870	235,602	8	214
Cerro Gordo																	
Clarke																	
Dallas																	
Floyd																	
Franklin																	
Guthrie																	
Grundy																	
Hardin																	
Howard																	
Keokuk																	
Page																	
Ringgold																	
Sac																	
Taylor																	
Washington																	
Warren																	
Total	76	44	$77,060	76	39	23,708,529	37	1,583,918	20,100	6,000	436,070	2,202,223	36	1,585,131	417,292	21	450

LIST OF IOWA CHEESE FACTORIES, NOVEMBER 1, 1897.

Arranged alphabetically according to counties and towns, near where factory is located, together with information pertaining to each.

Office record number.	LOCATED AT OR NEAR.	NAME OF CHEESE FACTORY.	Operated by individual, co-operative, or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF CHEESE-MAKER.	Method of receiving milk—by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Appanoose County.								
1	Iconium	Iconium	Stk Co	H. L. Vosburg, Pres	Iconium	Moravia and Tyrone.	N. Wycoff	Hd.	
2	Moravia	Star Cheese Co	Stk Co	Sam Johnson, Sec	Moravia	Moravia	N. Y. Wyckoff	Hd.	
3	Moulton	Moulton	Ind.	A. Dickson	Moulton	Moulton	Proprietor	Hd.	
4	Ray	Ray Cheese Co	Stk Co	R. F. Main, Sec	Ray	Main Station	H. G. Broshar	Hd.	
	Benton County.								
5	Atkins	Model	Ind.	R. O. Sprague, Mgr.	Cedar Rapids, Linn Co.	Atkins	A. O. Stewart	Hd.	
6	Newhall	Model	Ind.	R. O. Sprague, Mgr.	Cedar Rapids, Linn Co	Newhall	J. H Huyck	Hd.	
7	Rogerville	Excelsior	Ind.	R. E. Fairbanks	Rogerville	Garrison	Proprietor	Hd.	884
	Black Hawk County.								
8	*Waterloo	Waterloo—North Star	Ind.	The Fowler Co	Waterloo	Waterloo	Charles Wood	Test.	
9	*Waterloo	Waterloo	Ind.	The Fowler Co	Waterloo	Waterloo	F. E. Wightman	Test.	
	Bremer County.								
10	*Janesville	Janesville	Ind.	The Fowler Co	Waterloo, Bl'ck Hawk Co.	Janesville	A. M. Royer	Test.	
	Calhoun County.								
11	*Rockwell City	Rockwell City B. & C. Factory	Stk Co	T. C. Gregg, Sec	Rockwell City	Rockwell City	T. E Garrity	Test.	
	Cedar County.								
12	West Branch	West Branch—"Quaker"	Ind.	—— Eaves	West Branch	West Branch	D. Van Patten	Test.	

*Manufacture both butter and cheese.

LIST OF IOWA CHEESE FACTORIES—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CHEESE FACTORY.	Operated by individual, co-operative or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF CHEESE-MAKER.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Cerro Gordo County.								
13	Burchinal	Burchinal	Ind. ..	Coats & Hoffman....	Burchinal	Burchinal	Lewis Hoffman..	Hd.	
	Clarke County								
14	Weldon, Decatur county.	Weldon Cheese Factory..........	Ind. ..	Tallman & Parr.....	Weldon	Weldon	L. M. Parr.......	Test..	677
	Crawford County.								
15	Buck Grove. ..	Thew's Cheese Factory	Ind. ..	S. M. Thew	Buck Grove ...	Buck Grove ...	Proprietor.......	Hd.	
	Dallas County								
16	Woodward.....	Woodward Factory	Ind. ..	H. P. Colenky, Mgr..	Woodward	Woodward.....	Fred Colenky ...	Test..	204
	Davis County.								
17	Drakeville	Drakeville Dairy Association. ..	Stk Co	A. Fontz, Sec....	Drakeville	Drakeville.			
	Decatur County								
18	Bracewell.	A. A. Snow's Factory............	Ind. ..	A. A. Snow..........	Brownell	Brownell	Proprietor.	Hd.	
	Floyd County.								
19	Charles City...	Elm Spring Cheese Factory......	Ind. ..	H. D. White & Co....	Charles City ..	Charles City ..	H. D. White	Hd.	
20	Charles City...	St. Charles Cheese Co...........	Stk Co	A. O. Rusta	Charles City ..	Charles City ..	Burt Somer......	Hd.	
	Franklin County.								
21	Dows.....	Dows Factory	Ind. ..	A. A. Bangs.	Dows..........	Dows	Josie Bangs	Hd.	
	Greene County								
22	Grand Junct'n.	Grand Junction...................	Ind. ..	J. C. Harker.	Grand Junct'n.	Grand Junct'n.	....	Test.	
	Guthrie County.								
23	Jamaica.......	Jamaica Cheese Factory.	Ind. ..	A. H. Chadsey... ...	Jamaica	Jamaica	Proprietor.......	Hd.	
	Grundy County.								
24	*Reinbeck	The Fowler Co......	Ind. ..	The Fowler Co.......	[Hawk Co. Waterloo, Bl'ck	Reinbeck	G. A. Peace.		

	Hardin County.								
25	Hubbard......	Cottage Factory..................	Ind...	S. C. Christopher....	Cottage........	Hubbard.	W. Plumlsight ..	Hd...	264
26	Iowa Falls....	Ellis Cheese Manufacturing Co..	Stk Co	W. I. Clark, Mgr.....	Iowa Falls.....	Iowa Falls.....	W. I. Clark......	Hd.	
	Howard County.								
27	Cresco.	Cresco Cheese Co	Ind...	Kellow & House ...	Cresco........	Cresco..	J. J. House	Hd.	
	Humboldt County.								
8	Luverne, Kossuth county .	D Martyn's.....................	Ind..	D. Martin	Luverne, Kossuth Co.	Luverne.....	....	Hd.	
29	Renwick, Humboldt county	Elmer Factory.....................	Ind...	Conrad Elmer.	Renwick. .	Renwick.......	Fred Fahrney...	Hd.	
30	Renwick.	Fred Klasse Factory.......	Ind...	Fred Klasse.........	Renwick.......	Renwick.... ..	John Roteberer.	Hd.	
31	Renwick.......	Pioneer Factory.............. ...	Stk Co	F. Legler, Pres	Luverne, Kossuth county.	Renwick.	Proprietor	Hd	
32	Renwick.......	Speich Factory....................	Ind...	Fred Speich	Renwick	Renwick	B. Hoesley	Hd.	
	Jefferson County.								
33	Pleasant Plain	Pleasant Plain....................	Ind...	W. J. Alter	Pleasant Plain	Pleasant Plain	W. J. Alter......	Hd.	
	Johnson County.								
34	Iowa City.. .	Sharon Cheese Factory..........	Co-op.	F. M. Webber, Sec...	Iowa City . .	Iowa City ..	J. Gunyo..... ...	Hd.	
35	Morse.........	Shamrock Cheese Factory	Ind...	I. H. Shaver Ch. Co.	Cedar Rapids, Linn Co..	Morse	F. S. Snyder. ...	Hd....	200
	Jones County.								
36	Onslow	Mineral Valley Cheese Factory.	Ind...	John Fagan.........	Onslow	Onslow	H. E. Willard ..	Hd....	378
37	Onslow	Onslow Cheese Factory..........	Ind...	S. L. Gilbert.	Onslow	Onslow	Floyd Johnson..	Test..	48
	Keokuk County.								
38	Talleyrand...	Taileyrand.........................	Stk Co	L. M. Tucker, Sec...	Tallerand.....	Keota..... ...	C. Tucker........	Hd....	66
39	Webster........	Webster Cheese Factory...	Ind...	M. M. Wheeler, Sec..	Webster...	Webster.. ...	H. C. Wheeler...	Hd.	
	Lee County.								
40	Ft. Madison...	Denmark Factory...............	Ind...	T. G. Currie.	Ft. Madison...	Ft. Madison....	AlbertO.Lindsay	Hd.	
41	*West Point...	West Point Cheese Factory	Ind...	Jno.Walljasper, Mgr	West Point ..	West Point.	Henry Pogge	Hd.	
	Linn County.								
42	Marion....	Gray Factory.....	Ind...	Edward C. Clark....	Cedar Rapids .	Cedar Rapids..	W. R. Carol......	Hd.	
43	Springville....	Springville Factory.............	Ind...	Edward C. Clark ..	Cedar Rapids..	Cedar Rapids..	F. H Huyck.....	Hd....	123

*Manufacture both butter and cheese.

LIST OF IOWA CHEESE FACTORIES—CONTINUED.

Office record number.	LOCATED AT OR NEAR.	NAME OF CHEESE FACTORY.	Operated by individual, co-operative, or st'ck company.	NAME OF PROPRIETOR, SECRETARY OR MANAGER.	P. O. ADDRESS OF PROPRIETOR, SECRETARY OR MANAGER.	SHIPPING STATION.	NAME OF CHEESE-MAKER.	Method of receiving milk — by the test or by the hundred.	Dairy commissioner's test-bottle number.
	Marshall County.								
44	*Liscomb	Liscomb Butter and Cheese Co.	Co-op.	C. E. Bierstorm.	Liscomb	Liscomb	C. E. Bierstorm.	Test.	
	Montgomery County.								
45	Grant	Grant Cheese Co	Ind	John Hinton	Grant	Elliott	Proprietor	Hd.	
46	Red Oak	Lincoln	Ind	E. T. Evans	Red Oak	Red Oak	Proprietor	Hd.	
	Monroe County.								
47	Albia	Bluff Creek Factory	Co-op.	G. W. Murfise, Sec.	Albia	Albia	George Murfise	Hd.	
48	Albia	Bone Factory	Ind	S. G. Bone	Albia	Albia	Proprietor	Hd.	784
49	Albia	Diamond Cheese Co	Stk Co	Leroy Miller, Mgr.	Albia	Albia	Nelson Miller	Hd.	
50	Albia	Enix & Smith	Ind	Enix & Smith	Albia	Albia	Proprietors	Hd.	
51	Albia	Gholsen Cheese Factory	Ind	Dan Gholsen	Selection	Albia	May Gholsen	Hd.	
52	Albia	Hinton Factory	Ind.	Samuel Hinton	Albia	Albia	Proprietor	Hd.	
53	Albia	Hollingshead	Ind	J. Hollingshead	Albia	Albia	Proprietor	Hd.	
54	Albia	Griffin Cheese Factory	Ind	H. Griffin	Albia	Albia		Hd.	
55	Albia	Pharis Cheese Factory	Ind	Harry Pharis	Albia	Albia	Henry Pharis	Hd.	
56	Hilton	Hilton Factory	Ind	Rowles Bros	Albia	Albia	Harlan Rowles	Hd.	
57	Tyrone	Mt. Carmel	Ind	F. W. Crouch	Tyrone	Tyrone	R. E. Stoops	Hd.	
	Muscatine County.								
58	Muscatine	Shultz & Prinz.	Ind	Shultz & Prinz	Muscatine	Muscatine.			
	Page County.								
59	Northboro	Northboro Cheese Factory	Ind	W. H. Hatfield	Northboro	Northboro	Proprietor	Hd.	

	Poweshiek County.								
0	Grinnell	Neely's............	Ind...	J. E. Neely & Son...	Grinnell	Grinnell	W. J. Neely......	Test..	21
61	Jacob	Jacob Factory.......	Ind...	A. O. Payne..........	Jacob..........	Jacob..........	W. H. Payne.....	Test.	
62	Chester Center	Chester Center Cheese Co.	Ind...	W. W. Sherman.....	Chester Center	Chester Center	Proprietor.......	Test.	
	Ringgold County.								
63	Mt. Ayr........	Liberty Cheese Co...............	Co-op.	J. E. Main, Sec	Mt. Ayr........	Mt. Ayr........	L. O. Main	Hd.	
	Sac County.								
4	Odebolt........	Wheeler Factory..................	Ind...	H. O. Wheeler.......	Odebolt........	Odebolt........	Philip W. Farr.		
65	*Sac City.......	Blue Grass Butter and Ch Fact'y	Ind...	I. Hillman...........	Sac City........	Sac City.......	Fred Hillman...	Test.	769
	Story County.								
66	*Ames..........	Iowa Agri. College Creamery....	....	State of Iowa	Ames.........	Ames..........	G. L. McKay.....	Test..	304
	Taylor County.								
67	Sharpsburg....	Eastlack...................... ..	Ind...	F. M. Eastlack	Sharpsburg...	Conway........	Proprietor......	Hd.	
	Van Buren County.								
68	Farmington ...	Farmington Cheese Co...........	Ind...	....	Farmington ...	Farmington.			
	Wapello County.								
69	Blakesburg....	Mantua Cheese Co................	Ind...	Miller Bros.........	Albia, Monroe [Co	Albia.........	....	Hd.	
	Warren County.								
70	Milo...........	Belmont Cheese Co.............	Ind...	John Kellar.	Milo.......	Milo...........	Bell Parrott.....	Hd.	
	Washington County.								
71	Clay............	Clay Cheese Co..................	Co-op.	O. Meacham, Sec ...	Clay...........	Clay...........	....	Test.	
72	Dublin..........	Dublin Cheese Factory..........	Co-op.	H. Dickson, Sec	Dublin	West Chester..	M. L. Doaner....	Hd.	
73	West Chester..	West Chester Co-op. Cr'y Co.....	Co-op.	W. E Leet, Mgr.....	West Chester.	West Chester..	....	Hd.	
	Wayne County.								
74	Corydon	Corydon Cheese Factory.........	Ind...	Cross & White.......	Corydon.......	Corydon........	Clark White. ...	Hd..	81
75	Lineville.......	Lineville Cheese Factory.... ...	Ind...	Mathew DeHann....	Lineville.......	Lineville.......	Proprietor..	Hd	
	Winnebago County.								
76	Forest City....	Holland Factory.................	Stk Co	S. O. Holland, Sec...	Forest City. .	Forest City....	Fred Schuler....	H.	

* Manufacture both butter and cheese.

FINANCIAL EXHIBIT.

The following is a statement of the expenditures and receipts of the department for the year ending November 1, 1897:

EXPENDITURES.

Commissioner's salary account	$ 1,500.00
Commissioner's contingent expense account	467.77
Clerk's salary account	900.00
Milk agents' fees	1,488.00
Stationery and printing	424.53
Office supplies	1.60
Envelopes and postage	344.20
Laboratory supplies	55.89
Telegraph and telephone	14.62
Express and freight	37.58
Analyses and examination	20.00
Milk agents, special work	33.00
Extra office help	136.00
Total	$ 5,432.53

RECEIPTS.

Collected and remitted to treasurer of state for 620 permits for the sale of milk	$ 620.00

TEST BOTTLES AND PIPETTES.

In conformity with section 2515 of chapter 13, title 12, of the annotated code of 1897, relating to the duties of the dairy commissioner and the director of the Iowa Agricultural Experiment station, proper arrangements have been made for the issuing and filing of certificates in this office, of which the following is a copy. The name of the machine, manufacturers and other special descriptions are to be inserted in the blank spaces left for these purposes:

Original No -----

STATE OF IOWA.
AGRICULTURAL EXPERIMENT STATION,
AMES

To Whom It May Concern:

THIS IS TO CERTIFY, That the------------ ---- ------ ------------- steam motor hand milk tester, manufactured by------------------------- located at------ --- -------- - , state of --------------- -------- and sold by---------------------- -----, located at ----- --------------- state of---- ---------- ------- , has been examined and tested at the Iowa Agricultural Experiment station, and when properly and correctly operated will produce accurate measurements of butter fat, on condition that the test bottle or bottles, milk pipette, cream pipette, acid and acid measure shall conform to the following description and standard:

----------- -------------------------- ------------------------------
----
---- --------------------------- -- -------------- -----------------

The head, wheel or cylinder of this milk tester has a diameter of------ inches and requires not less than ------revolutions per minute. This certificate is issued in compliance with section 2515 of the annotated code of Iowa enacted at the extra session of the Twenty-sixth General Assembly, 1897.

Signed, ------------- -------------
Director Experiment Station, Iowa Agricultural College.

Dated this ----------day of----------------189 --

Under the section above referred to (2515) the dairy commissioner is obliged to keep on hand and furnish, upon proper application, a certified D. C. test bottle and pipette to those creameries and cheese factories that operate a chemical milk tester which, corresponding with a milk tester of the same manufacture, has been examined at the experiment station, and when the certificate for such examination has been placed on file in this office. It is necessary for managers of creameries and cheese factories, when making application for the test bottle or pipette, to include the name and kind of tester used, together with the name of the manufacturer or dealer from whom it was obtained. A blank form of application will be furnished by this office upon request. In compliance with the new law, those creameries and cheese factories that have on hand a D. C. test bottle will not be obliged to obtain another certified bottle, but must procure a certified D. C. pipette of the kind adapted for use of the milk tester they have. All others operating a milk tester should procure both the D. C. test bottle and pipette.

SKIM MILK TEST BOTTLES.

This department is not required to furnish a test bottle particularly adapted for the testing of skim milk, but on account of some controversy as to the correct readings of the divisions on the neck of certain skim milk test bottles, the department has considered it of sufficient importance to have a number of the two principal styles of double-necked bottles calebrated and examined in order to determine the value of the divisions of the scale on the bottles known as the Wagner and Ohlsson or Nausbaumer. The following are the results of the testing of five of each of these bottles. The test was made by Prof. J. B. Weems, chemist for the Iowa Agricultural college. The tests and comments given below comprise his report upon this subject:

OHLSSON OR NAUSBAUMER.		WAGNER.	
No. 1	.05085 per cent	No. 1	.0502 per cent
No. 2	.04965 per cent	No. 2	.4978 per cent
No. 3	.05160 per cent	No. 3	.0501 per cent
No. 4	.04860 per cent	No. 4	.049105 per cent
No 5	.05205 per cent	No. 5	.04949 per cent

The figures given represent each division of the scale.

The above results are for 18 grams. For practical results they are close enough to represent what they were designed for, that is, each division to represent .05 per cent for a charge of 18 grams.

It would seem from the result of this examination that there should be no occasion for further controversy as to what is the proper reading of the divisions of the scale on the double-necked skim milk test bottle when manufactured to correspond with those now in general use.

SYNOPSIS AND COMMENT ON THE NEW DAIRY LAW.

The dairy laws of Iowa were somewhat changed through the repeal of the old and the adoption of the new code by the extra session of the Twenty-sixth General Assembly in 1897. This department recognizes the importance of the changes and addition to the laws, and considers it unfortunate that those sections of the code relating to this department and affecting the dairy interests throughout the state cannot be printed in pamphlet form or reproduced in this report. Until an act authorizing or allowing such publication is passed by the general assembly, the annotated code will be the only source from which to ascertain the provisions of the dairy laws. The importance of giving these laws current circulation, so that the patrons of our creameries and cheese factories, the creamery and cheese factory managers and the city milk dealers, as well as those concerned in the manufacture and sale of oleomargarine, may know the exact position which they occupy in the conduct of their business, should cause the legislature, at an early date, to grant this department the privilege of publishing the dairy laws in all annual reports, and also in pamphlet form, that thev may receive a larger distribution. Our people cannot become too familiar with such laws, and the efficiency of this department can better be maintained through this agency. The dairy industry, as well as the people of Iowa, are to be congratulated that in no way have the laws relating to the manufacture, sale and use of imitation butter and cheese been impaired, but, on the other hand, have been made more effective by an additional provision prohibiting the soliciting or taking of orders for delivery of yellow colored oleomargarine or filled cheese in our state

Thus has another one of the numerous methods employed in getting fraudulent goods into consumption been made illegal. The necessity of branding or marking all cheese made from skimmed or partially skimmed milk on both package and cheese in a plain and durable manner, "Skimmed Milk Cheese," is another step in the right direction. The violation of this provision, in case of conviction, imposes a fine of not less than $25 and not more than $100. The maintenance of all premises and utensils in a clean and hygienic condition by city milk dealers and proprietors of creameries, cheese factories or reworkers or packers of butter is now made obligatory upon such person or persons, and further, they are obliged to make annual reports to the dairy commissioner, on blanks furnished by him, in a manner prescribed by the commissioner and embodying such facts as will assist in the compilation of statistics regarding the production, manufacture and sale of dairy products, and other matters that he may regard of importance connected therewith.

The importance of having a reliable and accurate milk test is recognized, and the dairy commissioner is required to furnish creameries and cheese factories, when properly applied for, a standard milk pipette, as well as a test bottle, either of which must be certified to be accurate, reliable and standard. But the law requires only such test bottles and pipettes to be furnished that are adapted for such milk-testing machines, the manufacturers or dealers of which have filed with the commissioner a certificate from the experiment station at Ames, to the effect that such milk-tester, when properly and correctly operated, will produce correct measurements of butter fat.

The law now, in addition to other regulations pertaining to the production and sale of milk, provides that cows kept for that purpose shall not be stabled in an unhealthy place, or in a crowded manner, and shall not be fed food which produces impure or unwholesome milk, or fed upon distilled glucose or brewery waste in any state of fermentation, or any substance in a state of putrefaction or rottenness.

The addition of water or any other substance or thing to whole milk or skimmed milk is declared an adulteration, and milk obtained from animals fed upon any substance of an unhealthy nature or upon waste as described above, is declared to be impure and unwholesome and the sale of all such milk is prohibited.

MILK AND CREAM STANDARD.

Milk which is proved by any reliable method of test or analysis to contain less than 12½ per cent of milk solids or three pounds of butter fat to 100 pounds of milk shall be regarded as skimmed or partially skimmed milk, and an article not containing 15 per cent or more of butter fat shall not be regarded as cream.

MILK INSPECTOR.

Any city milk dealer, employe or any other person resisting or interfering with the dairy commissioner or his agent in the performance of his duties in the collection of milk samples, etc., is guilty of misdemeanor and subject to severe penalty. The penalty for the violation of any of the provisions under title 22, chapter 13, of the code of laws here referred to, is a fine not exceeding $500, or imprisonment in the county jail not to exceed six months, or both such fine and imprisonment, at the discretion of the court.

CITY MILK TESTS.

About 500 city milk dealers, 40,000 families and 770 hotels, restaurants, etc., in thirteen cities of Iowa, each having a population of 10,000 or more people, are directly concerned in the work of this department in the system of city milk tests and inspection. In this number, the interest is mutual—the dealer in tests of his milk supply, and the family or consumer, in the quality of milk they buy. The importance of the work may be well understood in a consideration of this statement. It is the testing of samples of milk taken from the current supply of the dealer, while he is in the act of delivering to a customer, and the inspection of all wagons, cans and utensils, used in the sale and delivery of milk, that gives to the test and inspection system, its importance. The foremost feature of the work is to arrive at the quality and condition of milk sold. With the regular Babcock test, the quantity of butter fat in 100 pounds of milk, is ascertained, and if any tests less than 3 per cent of butter fat, the same is regarded by law as skimmed or partially skimmed milk, the sale of which is prohibited unless sold as such. The inspection of all cans, utensils, etc., is another feature of the work, equal in importance to the tests, if the quality as regards purity and cleanliness is to be taken into consideration.

Any infectious odor arising from the surroundings of the milk house, the wagon, or wherever the milk is exposed to the atmosphere, materially affects milk, and that to an extent which may be adjudged unhealthy and impure—unfit for use. In both the testing of milk, and the inspection of all apparatus used in its sale, it may be said with satisfaction that the authority of this department has been met with an apparent good feeling by the dealers and others interested, inasmuch as to bring the system to a point which signifies that Iowa with her laws upon these subjects, maintains a control over the product, such as has improved the trade and benefited the dealers accordingly.

The city milk agents appointed and maintained by this department have sought to faithfully fulfill their duties, and in protecting the rights of the consumer have, in most instances, been encouraged and assisted by the milk dealers of their respective cities. In addition to the police regulation of this work, the test system as now conducted with publications of results in annual reports and monthly publications in the daily press, the educational feature is advanced, as the test of each dealer's milk indicates the quality his herd produces. It is beneficial in that he may dispose of the inferior cows and replace them with a better grade. The consumer may rest assured that the quality of milk, as a part of his daily subsistence, is better and purer than it was before the establishment of the present system, and that it will not deteriorate, but improve, will depend much upon the advancement and continuation of the tests in our Iowa cities.

There are now thirteen cities having the regular milk tests. These cities, together with the city milk agents working therein, are as follows:

Burlington	W. B McChesney
Cedar Rapids	F. M. Brown
Clinton	A. E. Rumble
Council Bluffs	Rupert Fleming
Davenport	H. J. High
Des Moines	C. C. Chase
Dubuque	Dr. B. Michel
Keokuk	F. Harshman
Muscatine	Dr. John Tillie
Ottumwa	E. B. Hill
Sioux City	O. P. McCray
Marshalltown	E. M. Singleton
Fort Madison	Camp Thomas

PERMITS AND APPLICATIONS THEREFOR.

Since the laws relating to the city milk inspection system have become operative, the dealers in each city have been required to secure from this department a permit for the sale of milk from each and every wagon, depot or store in operation. Since the year ending July 4, 1894, the following is the number of permits issued annually in the cities of the state having inspection:

1894	359
1895	489
1896	566
1897	620

The increase during this period is 226. The largest increases were—1894, 130, and 1895, 77. The work of securing the names and addresses of dealers so as to notify them of the law with relation to the permit, has been not only complicated and continuous, but consisting of much care and attention. Dealers cannot be reached readily by mail, and since these permits must be applied for and issued direct from this office, without the assistance of the agent—save in locating and reporting those not having the permits—it has been one of the difficult features of the work.

No.-----

STATE OF IOWA,
OFFICE OF STATE DAIRY COMMISSIONER,
DES MOINES.

CITY MILK DEALER'S PERMIT.

By virtue of the laws of the state of Iowa, and the power in me vested, together with the fee ($1) in hand paid I, W. K. Boardman, state dairy commissioner, do hereby grant permission to---------------------------- to sell or deliver milk and cream in the city of------------------------- from one depot or store, located at No--------, --------------------street, one wagon starting from------------------------street in said city for the term ending July 4, 1898.

Dated this --------------day of------------------189----

Signed, ----------------------------
State Dairy Commissioner.
By----------------------------
Clerk.

Not transferable. Expires July 4, 1898.

In order to obtain the permit, a form of application was adopted by this office by which information was obtained and used in the compilation of statistics showing the number of cows, value of milk product, etc., as reported by each dealer for each city having the system of tests and inspection. The application blank was mailed to all dealers prior to July 4th, the date all permits expire in each year, so that when sending for their permits they would have a form enabling them to make application for permits without difficulty. In all cases the application was required, together with the fee of $1 for each permit, before the permit was issued. I would like to state in this connection, that a greater majority of the dealers making application for their permits answered the questions asked intelligently and to full satisfaction, thus showing interest in the work in their particular case. Following is the form of application.

STATE OF IOWA,
OFFICE OF
DAIRY COMMISSIONER,
Des Moines.

Form 5—1897.

W. K. BOARDMAN,
State Dairy Commissioner.

To City Milk Dealers.—Below will be found a list of questions pertaining to the production and sale of milk, for city consumption, as sold and delivered by you. Similar information has been obtained by this department in the three preceding years. The annual reports furnished city milk dealers upon examination will readily show the use made of such information. An important feature in this connection will be the comparisons from year to year. You are therefore earnestly requested to answer each and all of the questions to the best of your ability.

Important Notice.—Since all permits expire July 4th of each year, all milk dealers in cities having over 10,000 population are obliged to obtain from this office, on or before July 4th of each year, an annual permit for each milk wagon, store or depot from which milk is sold. Permits are not transferable, and all persons entering the business at any time of the year must make application for a written permit before doing business, and under all circumstances pay ($1) the full amount of the fee therefor.

Permit.—All persons selling or delivering milk as above are required to fill out the application blank below, sign and forward to this office to be placed on file, the application to be accompanied by Chicago exchange, express or postal money order, at the rate of $1 for each permit required.

This department will not assume or recognize any loss arising from remittances by cash or postage stamps.

CITY MILK DEALER'S REPORT.

1. Name of dealer, firm or company..
....
City..Street and number, or P. O. box number..
(Important: Write full name and address plainly.)
2. No. of wagons you sell milk or cream from...............No. of stores you sell milk or cream from...............No. of depots you sell milk or cream from...............
3. State whether or not you sell whole milk?..............................
cream?......................skimmed milk?......................
State, when making delivery, whether milk is poured from small delivery can, dipped from large can, drawn from faucet, or distributed in individual glass bottles or jars.
Poured from small delivery can?...................dipped from large can?.................drawn from faucet?.................distributed in glass bottles or jars?...............
4. How many months in the year do you conduct your business?............
5. How many families, hotels, restaurants and lunch counters, boarding houses, soda fountains and ice cream parlors do you supply with milk and cream—Private families?............hotels?............restaurants and lunch counters?............boarding houses?............ice cream parlors and soda fountains?............

6. State average value of milk sold per month, $..............
State average value of cream sold per month, $..............
State average value of milk and cream sold per month, $..............
7. Is all the milk or cream sold from your own herd?..............if not, what per cent or part do you buy?.................... ... From whom do you buy (name of party)?....................................

Name ....
Location ....
Name ....
Location ....
Name ....
Location ....

Is the milk and cream delivered to you?................Does the party you buy of retail milk and cream? ....If not, what per cent or part of his supply do you buy?..........................
State average number of milch cows in herd of party from whom you obtain your supply?................

8. State average number milch cows in your herd.................State number of Jerseys in your herd..................State number of grade Jerseys in your herd.................State number of Holsteins in your herd.................. State number of grade Holsteins in your herd ....State number of Shorthorns in your herd.............
State number of grade Shorthorns (frequently called Durham) in your herd...................... State number of Red Polled in your herd ....State number of grade Polled in your herd.............
State number and other kinds of breeds..............................
....
....

9. State different kinds of grain, fodder, etc., you feed your herd..........
....
....

10. State average number of persons employed in your dairy business......
11. What part or per cent of your milk and cream do you wholesale to other dealers?......................State plainly the names and addresses of other dealers to whom you wholesale milk (name of party):

Name ....
Location or address ....
Name ....
Location or address ....
Name ....
Location or address ....

APPLICATION FOR PERMIT.

(NOTE.—When more than one wagon, depot or store is operated, each should be numbered from one up to the number used.)

..................................189..

W. K. Boardman, State Dairy Commissioner, Des Moines, Iowa:

.............hereby make application for......permit......to sell milk in the city of......................, Iowa, for the year ending July 4, 1898.

The following is a memoranda of each depot, store or wagon under the management of the undersigned:

Milk depot, located at No. .... street
Store or shop, located at No. .... street
Wagon No. 1, starts from No. .... street
Wagon No. 2, starts from No. .... street
Wagon No. 3, starts from No. .... street
Wagon No. 4, starts from No. .... street

Herewith find enclosed a draft, postal money order or express money order, to the amount of .... dollars, for which please forward the number of permits enumerated above.

(Signature) ....

(NOTE.—In all cases $1 must accompany application.)

Permit issued for year ending July 4, 1897, was No. ......

All permits expire July 4th of each year.

With the individual reports of each dealer, and after a careful compilation of the information from each city, the following facts pertaining to the thirteen cities are gleaned: The census of 1895 relegates the population of the cities heretofore named to be 308,037. In these cities there are 535 wagons, depots and stores from which milk and cream are sold, and these dealers supply 88,017 families and 767 hotels, restaurants and boarding houses, with milk and cream reported to be valued at $732,536. The reports show 8,030 cows supplying milk to this trade, which would net as the average value of each cow's production, $89 annually. A very slight difference is found in the comparison of this with the last annual report. It has been noticed from reports received that a larger number of dealers buy their milk from farmers or wholesale dealers than last year.

In the manner of delivering milk, outside of that of the wagon, depot or store, it is found that the number selling bottled milk, or milk put up in glass jars, remains about the same; however, from personal observation, it has been found that the volume of the business has increased to a large and noticeable degree. In some cases, dealers who put up their milk in glass bottles or jars, have established depots along the line of their routes, where there may be a transient call for it, and in case on the following day there is some left unsold, it is taken back to the dairy and churned into cottage cheese, for which there is some demand. It is acknowledged, that unless the best of care is taken to thoroughly cleanse the bottles or jars, and likewise keep from them, while filling, all obnoxious odors or dust, etc., the milk is spoiled easily. The glass bottle is considered by some a safeguard against unhealthy substances sometimes found in milk delivered in cans. Still, if corked air tight and the animal heat and odor is not assisted in evaporation while the milk is being cooled, the effect will be detrimental, resulting in bad flavor and early fermentation to a much greater extent than when milk is delivered in open cans.

INFORMATION PERTAINING TO CITY MILK SUPPLY.

Following is a table of information compiled from blanks received by this department in the form of applications for permits from city milk dealers. This table shows the number of wagons and depots operated in each city; the manner of distributing milk, and the number selling skimmed milk and cream; the number of families, hotels, restaurants, etc., supplied by city milk dealers; the yearly value of all milk sold; number and grade of cows from which the city milk supply is taken; total number of cows in each city, together with the yearly average per cow. Since this table is compiled by cities, the direct information as pertains to each city is given:

CITIES.	Population census of 1895.	PERMITS ISSUED FOR YEAR ENDING JULY 4, 1896.			MANNER OF DISTRIBUTING MILK.			KINDS OF MILK SOLD.			No. persons employed.	NO. OF FAMILIES, HOT'LS & REST'RNTS SUPPLIED.		Yearly value of milk sold.	NUMBER DIFFERENT BREEDS OF COWS FROM WHICH MILK SUPPLY IS OBTAINED.								Yearly average value of yield per cow.
		Wagons.	Depots.	Total.	Dipped or poured from cans.	Drawn from faucet in cans.	Delivered in bottles or jars.	Whole milk.	Cream.	Skimmed milk.		Priv. families.	Hotels, restaurants, etc.		Jerseys.	Grade Jerseys.	Holsteins.	Grade Holsteins	Shorthorns.	Grade Shorthorns.	Common stock, or not given.	Total of all breeds.	
Burlington	23,346	37	12	49	31	3	15	49	25	11	93	4,320	20	$67,423	76	91	37	50	9	103	391	756	$89.20
Cedar Rapids	21,555	42	14	56	42	8	6	56	29	8	111	3,611	39	54,592	80	67	49	46	16	174	212	644	84.77
Clinton	23,877	33	5	38	30	5	4	38	13	4	48	1,270	53	42,989	73	34	31	21	40	52	390	640	79 00
Council Bluffs	20,189	30	2	33	30		2	32	9	12	85	1,812	57	43,021	45	17	34	23	51	89	217	476	90.40
Davenport	30,010	69	8	77	64	8	5	77	38	22	190	5,523	83	93,146	70	50	67	13	38	94	725	1,057	88.00
Des Moines	56,359	88	33	121	87	30	14	121	104	87	198	7,180	146	138,230	59	112	171	127	76	218	610	1,373	100.80
Dubuque	40,574	50	12	62	50	8	8	62	32	19	69	4,750	70	77,937	89	87	22	19	43	59	714	983	80.00
Fort Madison	10,082	15	2	17	13	4	2	17	8	5	17	1,478	19	21,400	12	33	8	12	9	49	143	266	70.90
Keokuk	14,287	23	.	23	23	..	1	23	14	4	27	1,819	77	37.112	84	36	27	31	27	20	117	342	108.50
Marshalltown	10,049	13	3	15	15	..	2	15	8	7	17	1,384	33	22,516	11	48	9	22	31	61	61	243	98.25
Muscatine	12,237	11	2	13	23	..	1	23	12	4	24	1,296	24	22.310	52	57	19	18	12	26	80	264	85.00
Ottumwa	16,761	20		20	20		2	20	11	6	20	1,911	64	36,918	10	61	11	97	60	80	65	384	96.15
Sioux City	27,871	56	6	62	57	3	5	62	29	17	70	1,718	78	64,912	45	74	33	84	64	78	324	703	93.46
Total	308,087	436	99	535	435	69	67	535	242	206	893	38,017	767	$732,536	705	717	518	563	476	1,103	4,049	8,130	$89.00

In order to give a comparison of the results, and the average of the tests obtained, the following table, showing the number and average test for each city, together with the total number and average test for all cities in the state, is given. The compilation is for the years 1893, 1894, 1895, 1896 and 1897:

A comparison of total number of tests made in each city yearly, with average per cent of butter fat for each year, and average for the five years ending October 31, 1897.

CITIES.	1893.		1894.		1895.		1896.		1897.		Average for five years.
	No tests made.	Average test.	No. tests made.	Average test.	No. tests made.	Average test.	No. tests made.	Average test.	No. tests made.	Average test.	
Burlington	527	3.73	444	3.75	456	3.75	462	3.84	514	4.19	3.88
Cedar Rapids	480	3.78	381	4.00	266	3.88	350	4.16	313	4.06	4.03
Clinton	235	3.71	271	3.88	309	3.71	421	3.77	268	3.80	3.79
Council Bluffs	492	3.51	320	3.62	506	3.64	593	3.83	595	3.80	3.72
Davenport	501	3.65	337	3.66	394	3.58	563	3.77	663	3.80	3.70
Des Moines	545	3.27	655	3.81	1,029	3.70	1,064	3.96	1,591	3.72	3.79
Dubuque	425	3.35	358	3.51	409	3.90	542	4.08	546	3.97	3.88
Keokuk	246	3.56	287	4.33	316	4.41	289	4.40	352	4.44	4.39
Muscatine	83	3.69	386	3.80	435	3.91	315	3.98	256	4.07	3.94
Ottumwa	78	3.87	193	3.67	237	3.95	174	4.26	177	4.42	4.07
Sioux City	323	3.71	352	3.67	492	3.67	506	3.88	556	3.75	3.74
Marshalltown	.....		.	....	....	....	456	3.95	458	3.83	3.89
Fort Madison	....	......	....	....	......	....	137	4.15	390	4.07	4.11
Total and av. test for each year	3,935	3.59	3,984	3.79	4,849	3.82	5,871	4.00	6,679	3.99	
Average test for entire period	......	.....	.....	....	......	.....	....	......	......	......	3.94
Total tests made in thirteen cities during entire period	......	......	....	......	.....	.....	......	......			25,318

In order to compare the number of tests and the tests by months, for each of the cities during the past five years, the following table has been prepared:

BURLINGTON.

MONTHS.	1893.		1894.		1895.		1896.		1897.	
	Number tests made.	Average test	Number tests made	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.
November	10	4.04	34	3.81	44	3.62	56	3.63	44	4.30
December	48	3.51	61	3.95	85	3.63	71	3.64	46	4.25
January	32	3.87	35	3.79	38	3.70	39	3.78	41	3.90
February	69	3.39	48	3.74	59	3.75	44	3.40	49	3.93
March	62	3.61	57	4.05	47	3.68	40	4.00	81	4.10
April	42	3.70	23	3.53	37	3.74	8	3.74	78	4.10
May	53	3.93	47	3.76	57	3.65	42	3.90	58	3.80
June	51	4.07	.....	.....	22	3.84	37	3.91	12	4.00
July	27	3.97	38	3.61	58	3.74	24	3.64	27	4.30
August	88	4.07	42	3.78	......	......	81	4.08	21	4.03
September	46	3.61	25	3.74	31	3.55	33	4.10	25	4.50
October	43	3.53	34	3.52	28	4.20	37	4.30	32	4.28
Total and average	527	3.73	444	3.75	456	3.75	463	3.84	514	4.19

CEDAR RAPIDS.

MONTHS.	1893.		1894.		1895.		1896.		1897.	
	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.
November	66	3.73	17	4.04	20	3.94	31	4.09	49	4.20
December	71	3.91	43	4.12	...	......	12	4 00	42	4.02
January	18	3.94	14	3.94	39	3.77	..	......	40	3.98
February	......		70	3.96	19	4.06	34	3.98	16	3.89
March	39	3.78	16	4.18	23	3.80	18	4.12	......	.....
April	19	3.58	20	4.03	......	......	45	4.07	59	3.95
May	60	3.50	......	......		...	..	....	......	......
June	65	3.60	37	3.84	20	3.61	43	4.03	......	......
July	35	3 75	80	3.90	102	3.83	20	4.25	......	.....
August	28	3.78	35	3.95	......	.....	39	4 50	53	4.30
September	48	3.92	......	....	......	......	40	4.31		
October	31	4.08	49	4.04	43	4.18	68	4.24	54	4.14
Total and average	480	3.78	381	4.00	266	3.88	350	4.16	313	4.08

CLINTON.

MONTHS.	1893.		1894.		1895.		1896.		1897.	
	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.
November	14	4.14	42	4.04	......	......	30	4.20	......	.....
December	......	......	29	4 17	22	4.01	28	4.12	......	....
January	....	.....	28	3.94	21	3.88	32	3.95	11	3.97
February	......	.....	58	3.85	30	4.27	33	3.64	59	4.06
March	.....	...	44	3 73	24	3.81	33	3.80	.. .	...
April	27	3.87	......	......	21	3.69	32	3 78	32	3.91
May	43	3.59	15	3.63	23	3.61	31	3.34	36	3.30
June	43	3.30	.	....	24	3.28	31	3 34	32	3.60
July	27	3.53	20	3 42	53	3 37	34	3.55	35	3.96
August	22	3.61	15	3.57	27	3.54	69	3.70	31	3.62
September	30	3.65	20	4 59	33	3.57	32	3 80	32	3.70
October	29	3 96	.....	.....	31	3.75	36	4.04	......	......
Total and average	235	3.71	271	3 88	309	3.71	421	3.77	268	3.80

COUNCIL BLUFFS.

MONTHS.	1893.		1894.		1895.		1896.		1897.	
	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.
November	14	3.52	38	3.82	15	3.69	39	3.92	20	4.05
December	22	3.54	40	3 99	46	3.61	34	3.90	40	4.00
January	40	3.44	38	3.87	30	3 54	35	3.83	40	3.90
February	43	3.44	12	3.72	33	3.52	55	3.60	60	3.90
March	58	3.40	53	3.68	64	3.53	72	3.67	76	3.85
April	75	3.52	14	3.67	67	3.50	81	3.84	80	4.00
May	49	3.49	14	3.35	61	3.53	57	3.80	69	3.80
June	50	3.39	......	......	32	3.54	60	3.74	56	3.80
July	40	3 45	15	3.62	72	3.74	39	3 74	53	4.13
August	13	3.90	31	3.62	34	3.82	38	3.80	17	4.40
September	51	3.61	15	3.72	31	3 77	21	3.91	48	3.95
October	37	3.65	47	3.80	32	3.90	62	3.98	36	4.10
Total and average	492	3.53	320	3.62	506	3.64	593	3.83	595	3.80

DAVENPORT.

MONTHS.	1893.		1894.		1895.		1896.		1897.	
	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.
November	41	4 04	40	3 64	15	3.61	35	3.70	96	3.58
December	59	3.82	38	3 64	14	3.25	40	3.98	47	3.66
January	......	.....	25	3.28	14	3.68	45	3.83	48	3.80
February	28	3.91	23	3.57	39	3 96	50	3.96	71	3.70
March	47	3.95	15	3.95	40	3.76	49	3.90	71	3.80
April	14	3.61	43	3.46	36	3 62	35	3.84	49	3.79
May	69	3.61	14	3.76	39	3.62	60	3.70	49	3.64
June	70	3.45	......	.....	35	3.66	48	3.76	42	3.86
July	37	3.06	18	3.32	107	3.80	24	3.70	50	3.59
August	48	3.32	49	3.99	......	......	36	3.54	47	3.65
September	49	3.51	42	3.97	31	3.76	70	3.72	45	3.65
October	39	3.87	30	3.65	24	3.73	72	3.71	48	3.65
Total and average	501	3.65	337	3.66	394	3.58	562	3.77	663	3.80

DES MOINES.

MONTHS.	1893.		1894.		1895.		1896.		1897.	
	Number tests made.	Average test.	Number tests made	Average test.	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test.
November	14	4.03	24	3.43	53	3.60	70	4.00	126	4.23
December	10	3.60	18	3.51	72	3.55	80	4.04	132	4.00
January	57	3 86	95	3 57	69	3.90	78	4.00	132	3.96
February	36	3.60	44	3.72	76	3.67	84	3.90	137	3.80
March	27	3.44	21	3.73	90	3.56	44	3.70	139	3.78
April	56	3 50	75	3.53	89	3.90	116	3.70	120	3.80
May	180	3.32	48	4.12	118	3.78	39	3.80	106	3 70
June	61	3.69	68	3.90	91	3.66	90	4.34	160	3.58
July	64	3.66	68	4.21	118	3.70	103	3.82	138	3.66
August	31	3.61	69	4.21	80	3.71	117	3.96	131	3.76
September	73	3.55	72	4.20	81	3.84	112	4.10	137	3 45
October	......		63	3.49	92	3.73	131	4 04	133	3.72
Total and average	545	3.27	655	3.81	1,029	3.70	1,064	3.96	1,591	3.82

DUBUQUE.

November	18	3.35	31	3.45	15	3.69	44	4.18	47	4.05
December	20	3.34	50	3.72	23	3.83	47	4 18	46	4.04
January	39	3.38	45	3.40	20	4.14	46	3.95	47	4.14
February	12	3.43	10	2 94	23	3 30	45	4.10	48	3.67
March	56	3.42	42	3.33	47	3.71	47	4 05	48	3.87
April	24	3.53	30	3.28	48	4.02	48	4.08	47	3.95
May	31	3.26	37	3 34	46	4.25	46	3.93	39	4.08
June	15	3 09	23	3.35	47	3 95	47	3.90	47	4.04
July	39	3.35	21	3.96	32	4.09	45	4.13	47	4.00
August	41	3.50	19	3.78	36	3 96	46	4.29	48	3.97
September	56	3.55	23	3.71	48	3.94	47	4.03	46	3.98
October	74	3.57	27	3.87	24	3.95	34	4.07	36	3.96
Total and average	425	3.35	358	3.51	409	3.90	542	4.08	546	3.97

KEOKUK.

November	14	4.14	20	4.31	12	4.32	20	4.42	33	4.08
December	......	......	32	4.99	33	4.57	11	4.32	34	4.27
January	......	......	21	4.60	37	4.35	16	4.00	22	4.25
February	......	......	32	4.19	24	4.53	28	4.61	34	4.27
March	......	......	32	4.43	21	4.73	30	4.64	22	4 68
April	10	3.46	12	4.17	33	4.86	32	4.63	32	4.86
May	52	3.56	20	4.17	33	4.70	22	4.43	23	4.70
June	38	3.60	......		23	4.09	34	4.12	37	4.23
July	33	3.03	24	3.84	27	4.09	20	4.58	33	4 12
August	66	3.44	35	4.19	34	4 08	32	4.14	24	4 67
September	13	3.41	24	4.24	23	4.15	33	4 22	34	4.61
October	20	3.85	35	4.34	16	4 45	23	4.72	24	4.68
Total and average	246	3.56	287	4.32	316	4 41	289	4.40	352	4 44

MUSCATINE.

November	9	4.42	23	3.73	24	3.92	14	3.10	21	4.10
December	......	......	28	3.81	35	4 04	46	3.99	35	3.98
January	......	......	44	3.72	12	4 02	45	3.97	24	3.93
February	16	3.49	49	3.65	37	4.06	11	3.27	34	3.60
March	......	......	67	3.79	51	3.90	32	3.86	12	3.76
April	15	3.76	18	3.79	26	3.52	23	3.97	......	......
May	......	......	38	3.76	38	3.93	23	4.11	21	4.15
June	9	3.70	......	......	35	3.74	......	......	21	4.47
July	9	3.56	31	3.76	64	3.87	35	4.05	29	4 40
August	......	......	38	4.04	38	4.18	21	4.11	18	3.95
September	......	......	16	3.77	37	3.91	43	3.96	41	4.51
October	25	3.20	34	3.99	38	3.89	22	3.83	......	......
Total and average	83	3 69	386	3.80	435	3.91	315	3.98	256	4.07

OTTUMWA.

MONTHS.	1893.		1894.		1895.		1896.		1897.	
	Number tests made.	Average test.	Number tests made.	Average test.	Number tests made.	Average test	Number t sts made.	Average test	Number tests made.	Average test
November	16	3.81	51	3.45	21	4.52	14	4.57	16	4.61
December	.....	.....	......	..	23	3 46	15	4.46	16	4 58
January	......	......	28	3.34	11	3.96	11	4.34	15	4.76
February	......	.....	15	3 83	17	4.32	14	4.08	14	4.40
March	16	3.76	34	3.41	17	4.03	13	5.25	15	4.29
April	20	3.07	8	3.55	14	3.66	13	4.20	14	4.27
May	8	3.40	....	.....	16	3.68	15	4.20	15	4.48
June	9	3.76	8	3.37	23	3 77	15	4 10	14	4.07
July	......	......	25	4.16	54	4.08	17	4.11	15	4.23
August	......	......	....	......	15	4.14	15	4.10	15	4.20
September	..		15	4.46	18	3 91	16	4.60	13	5.27
October	9	3.69	9	3.97	14	3.91	16	4 60	15	4.03
Total and average	78	3 87	193	3 67	237	3 95	174	4 28	177	4 42

SIOUX CITY.

November	37	3.97	33	3.52	27	3.81	51	3.61	47	3.88
December	28	3.59	23	3.67	28	3 70	53	3.80	40	3.79
January	37	3.65	34	3.54	27	3.76	45	3.93	37	3.60
February	23	3.93	25	3.61	35	3 73	44	3.90	48	3.53
March	37	3.75	33	3 77	40	3.64	41	4.19	47	3 54
April	23	3.72	24	3 63	41	3 44	39	3 70	57	4.35
May	39	3.57	39	3.67	43	3.63	40	3.80	56	3.59
June	25	3.83	24	3.53	38	3 65	40	3.76	50	3.64
July	22	3.64	29	3.69	111	3.86	39	3 64	44	3.77
August	12	3.88	29	3 76	43	3.76	35	3 60	44	3 73
September	25	3.53	29	3.73	39	3.50	31	3.58	45	3.74
October	15	3.49	28	3 88	20	3.61	49	3 49	41	3.88
Total and average	323	3.71	352	3.67	492	3.67	506	3.88	556	3 75

MARSHALLTOWN.

MONTHS.	1896.		1897.	
	Number tests made.	Average test.	Number tests made.	Average test.
November	19	4.30	15	4.08
December	37	4.31	38	3.87
January	33	4.07	42	4.01
Febrnary	44	4 36	43	3.81
March	40	4.00	37	3.85
April	45	3.87	37	3.76
May	35	3.70	51	3.94
June	55	3 81	35	3.90
July	36	3.73	19	3.44
August	47	3.91	52	4.08
September	32	3 48	55	3 97
October	33	3 93	34	3.29
Total and average	456	3 95	458	3.88

FORT MADISON.

June	9	3.66		
July	35	3 98	34	3.97
August	21	4.58	31	4.32
September	35	4.36	35	4.14
October	37	4.36	34	4.03
Total and average	137	4.15	390	4 07

TESTS OF CREAM.

In the last annual report of this department, for the first time, a report of the number and average of cream tests in the state for the year ending November 1, 1896, was published. Cream tests were not at that time compulsory on the part of the department, but these tests were made with a view to finding out the average quality of cream sold to the city trade. During 1896 there were fifty-nine tests and an average of 18.84 reported for all the cities in the state where the tests were made. During the year ending October 31, 1897, 111 tests were made, and the average was 19.86. This shows an increase in the number of tests of fifty-five and a difference of 1.02 per cent in favor of 1897. The law upon this subject places the standard of cream at 15 per cent. In the 111 tests made, but two are below the standard, both being from Des Moines dealers. The lowest test below standard was 12.90, and the other 13.50 per cent, while the highest test made was 33 per cent, made in Council Bluffs. The highest test made during 1896 was 27 per cent, being in the city of Cedar Rapids, and the lowest test, 9 per cent, made in the same city. That there is now a much larger cream sale carried on by the Iowa milk dealers, has been ascertained by the reports from each of the dealers when making applications for their permits. The tests of the past year show decisively that a good quality of cream is sold the trade. Since the tests of cream will be conducted regularly from now on, it is expected the quality will improve still more. The following is a table showing the date and average test of cream in each of the cities.

CREAM TEST.

NAME OF DEALER.	Date of test.	Test.
Burlington.		
F. M. Parsons	March 4	19.80
F. W. Buhrmaster	July 12	13.20
H. C. Kestner	July 8	16.20
J. T. Wotten	March 11	17.70
M. H. Davis Milk Co.	March 31	15.60
M. H. Davis Milk Co.	March 31	13.80
O. G Van Winkle	May 4	21.30
E. T. Swords	May 29	15.90
Cedar Rapids.		
L. W. Alt	April 27	18.60
F. Kilmeyer	April 27	21.00
Miller Bros.	April 27	21.00
Clinton.		
W. C. Anderson	July 21	26.40
W. C. Anderson	July 17	21.00
W. C. Anderson	June 26	24.10
Clinton Cream Depot	June 26	33.50
Clinton Cream Depot	July 22	28.50
Clinton Cream Depot	Aug. 19	28.20
Clinton Cream Depot	Sept. 18	26.60
J. Reter	June 26	22.80
J. Reter	July 22	27.60
J. Reter	Sept. 20	25.20
Council Bluffs.		
E. Easdale	July 12	19.80
J. Ellsworth	May 26	20.10
J. Ellsworth	June 3	18.00
A. C. Ellsworth	May 8	19.80
A. C. Ellsworth	June 12	19.50
A. C. Ellsworth	Sept. 17	21.00
W. H. Kissel	Sept. 17	33.00
H. H. Martin	May 20	19.20
H. H Martin	Oct. 23	20.10
N. P. Nelson	May 20	17.70
Otto Skodesholm	June 12	20.40
Otto Skodesholm	July 23	21.60
Davenport		
H. T. Abraham	June 17	30.30
J. F. Laible	June 17	26.40
Des Moines.		
R. C. Arthur	Feb. 6	21.90
Robert S. Bennett	Dec. 12	19.50
W. P. Bennett	Aug. 5	23.50
W. P. Bennett	Sept. 22	20.10
W. P. Bennett	Oct. 23	21.00
Bragdon Bros. 1	Jan. 16	15.60
Bragdon Bros. 2	March 20	15.50
Bragdon Bros. 2	May 22	19.20
Bragdon Bros. 1	Aug. 7	15.60
Bragdon Bros. 1	Oct. 8	16.80
J. Cruinkshank	June 11	15.60
Ed. Campbell	July 10	18.00
W. F. Carter	March 11	21.00
Des Moines Dairy Co	May 1	18.60
Ehle & Ehle	Nov. 14	12.90
L. Filson	June 12	19.80
G. W. Felt	Nov. 21	17.10
G. W. Felt	May 19	19.50
F. C. Harless	Feb. 13	17.70
Iowa Dairy Co. 2.	Dec 11	24.00
Iowa Dairy Co. 2.	March 13	15.90
Iowa Dairy Co. 2.	June 11	17.10
Iowa Dairy Co. Depot.	Dec. 19	14.70
Iowa Dairy Co. 3.	Jan. 16	18.90
Iowa Dairy Co. 3	Feb. 18	18.30
Iowa Dairy Co. 1.	July 7	20.10
Iowa Dairy Co 2	July 7	20.40
Iowa Dairy Co. 4	July 23	15.00
Iowa Dairy Co. 4	Aug. 2	18.00
Iowa Dairy Co. 2.	Aug. 10	20.10
Iowa Dairy Co. depot.	Aug. 12	25.50

CREAM TEST—CONTINUED.

NAME OF DEALER.	Date of test.		Test.
Des Moines—continued.			
Iowa Dairy Co. 2	Sept.	11	24.00
Iowa Dairy Co. 3	Sept.	11	18.90
Hawkeye Milk Co. 3	March	11	18.00
Hawkeye Milk Co. 1	April	3	18.50
Hawkeye Milk Co. 2	July	10	16.80
Hawkeye Milk Co. 3	Aug.	5	19.20
Hawkeye Milk Co. 2	Aug.	2	18.90
O. R. Johnson	April	3	18.60
L. Jones	May	6	18.90
J. Kampinsky	June	11	20.10
McConnell Bros	Jan.	23	19 50
McCowan Bros	June	12	15.30
J. M. Muellar	July	10	18.30
J. M. Muellar	Aug.	10	16.80
E. E. Moon	Aug.	3	18.60
E. E. Moon	March	6	24.00
H. Pickering	Sept.	2	18 90
O. B Pickering	Nov.	11	20.50
O. B. Pickering	April	10	23.00
Mrs. H. A Pugh	Sept.	25	15 30
J. S. Smith	Nov.	7	24.00
William Stubbs 1	Nov.	21	17.10
William Stubbs 2	Feb.	13	18.30
William Stubbs 1	May	22	18.00
William Stubbs 2	June	13	18.30
William Stubbs 1	July	13	18.00
William Stubbs 2	July	13	20.70
A. Terry	Feb.	13	17.70
A. Terry	Aug.	7	16.80
H. S Shoemaker	Aug.	7	15.90
W. H. Thomas	May	26	18.60
Vail's Dairy	Feb.	20	24 90
J. P. Von Steuben	Aug.	2	19.80
F. West	Feb	8	18.30
F. West	March	20	24.00
F. Woolbridge	Aug.	7	15.90
D. F. Wilson & Bro	July	10	15.30
D F. Wilson & Bro	Aug.	7	16.80
Young Bros	Nov.	11	16.80
Young Bros	Sept.	11	18.90
J. H Windsor	June	8	16.20
Muscatine.			
Will Bros	Aug.	6	17.40
G. W. Le Ferve	Sept.	28	19.80
Ottumwa.			
J. S McClurg	May	8	22.00
Fort Madison.			
T. G Currier	Dec.	18	17.40
Total and average		111	19.86

NEEDS OF THE CITY MILK TRADE.

Inspection of Herds.—In previous reports of this department it has been stated there was an apparent need and call for inspection of herds and of premises where milk for the city supply is produced—the stables where all dairy cows are kept, and the milk houses, etc., wherever milk is handled, and where it passes from the cow to the cans and is made ready for delivery. The milk agents in cities now having inspection have so far looked to the cleanliness of all wagons, cans and utensils, but have not, owing to the limited appropriation, examined the stables and premises where milk is produced, only to a limited degree. It cannot be expected that the agents can visit the dairy farms, which are in most cases many miles in the country, away from easy approach, and requiring a day or a half a day for each place, all to be paid from the fund appropriated for a limited number of tests of the city milk supply. However, the dairy commissioner in person and several of the agents have visited certain dairies and found the condition of things sufficiently in need of attention to warrant the inspection, and to convince any one of the need of additional appropriation to enable the department to have thorough inspection of all dairies supplying the city trade.

The state veterinary surgeon has visited and tested some of the herds in one of the cities of Iowa named in this report, with the result that several of the cows from which the milk supply was being taken were found to be affected with tuberculosis, and were killed. The fact that the milk of these cows was consumed day by day by a number of families, and that tuberculosis in milk may be, without a shadow of doubt, transmitted to man, should not be looked upon with indifference, but, on the other hand, laws and regulations should be enacted with a view to the proper protection of our people against such a danger to life and health. As a surety against the spread of tuberculosis, the tuberculin test, when correctly used, will determine whether or not the disease exists in the cow, and this should be one of the avenues to insure the delivery of pure and wholesome milk to the milk consuming public.

There is a clause in the dairy laws of Iowa, found in the annotated code of 1897, page 1,952, section 4988, which was enacted with a view to establish protection against any diseased milk. This clause provides that milk taken from a cow having any disease of a character to produce unhealthy or impure milk, or having ulcers, running sores, or from cows when stabled in an unhealthy or crowded condition or fed upon distilled, gluecose or brewery waste in any state of putrefaction or rottenness, shall be prohibited from sale, and any person violating any of these provisions shall be subject to the penalty of the law.

The milk dealers in our cities should make it a point to advise themselves as regards the laws which relate to their business, to the condition of the milk sold, and to cows connected therewith. The annotated code of Iowa may be found in the office of any county officer, or in the office of any justice of the peace. It is unfortunate that the legislature has not provided for the publication in pamphlet form or otherwise of the dairy laws of Iowa, and it is to be hoped that the Twenty-seventh General Assembly will so amend the publication clause as to permit of the publication and distribution of the dairy laws in the annual reports of this department, or in pamphlet form when needed, as the state in no way can expect to have the laws more readily complied with than by familiarizing every person affected by their provisions with them.

As to cleanliness in stables and on the premises where each dealer produces milk for his supply, the strictest of sanitation should rule. This is a matter of business requiring business conduct, for the stable, milk house, cans and utensils, milk cows and all stock concerned in the business should receive as much, if not more care than would a store or other place open to the public view to be used in this class of trade. Care in the conduct of a stable will not only add value to the property, but will insure the health and thrift and fruitfulness of the herd. In the case of the wagon and utensils, value and long usage are also added. The continuous value of an article should be an incentive to cleanliness and careful handling. The cleanliness of all premises should be observed, if for no other reason than to protect the milk from germs, dirt, or odors of any kind, considering that if the milk is exposed it will receive such germs or odors, and when consumed will be received into the human organism, which should be protected rather than endangered against such affectations. Sickness of a contagious character in the family of the dairyman should be reason for either an absolute discontinuation of the sale of milk from such premises or the removal of the patient, and thorough disinfection of all articles coming in contact in any way with the milk supply, thus conforming to the regulations of the state board of health.

Milk Delivery Wagons.—One of the best advertisements the bakery, laundry, grocery and oil business have, is the wagon in which their goods are delivered to the custom People are inclined to regard these traveling representatives of the business as an insight into their class and manner of conduct. Our people do not buy bread from a crippled, worn out and unclean bread delivery wagon, for the reason that the bread itself comes into close contact with either the wagon or the conditions surrounding it. This is true also of the milk business. I have observed a large number of the milk dealers in the cities of Iowa having the test system, operate wagons which, taken as the true representative of their business, are unfit for use and have long since outlived their usefulness. The chance of the milk delivered in such wagons being affected by the surroundings, and in cases where dealers are in the habit of hauling swill and other odorous substances in their wagons, should be reason enough to condemn the practice and for prohibiting the use of such wagons for the delivery of milk. The wagon in each instance is the business house itself. The public notice and interest themselves in these traveling stores. Under these circumstances, it should be the aim of every milk dealer to have his wagon appear as respectable and well equipped as possible, bearing in mind the fact that it will not only establish his business upon a better basis, but will add value and long usage, if properly cared for. It will in a measure retain custom, and, in consideration of the product sold and the times, will increase his trade. "There is no man too poor to care for his property, and no man too rich to justify neglect.

LIST OF CITY MILK DEALERS.

Following is a list of all milk dealers in the state of Iowa having tests of milk during the year ending Nov. 1, 1897. The cities and the names of dealers are arranged alphabetically. This table shows the manner of selling milk, total number of tests had during the year, the highest test, lowest test, average test, and the number, if any, below standard:

BURLINGTON.

NAME.	MANNER OF SELLING MILK.	Permit number for 1897.	Permit number for 1898.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
Binder Bros	Wagon	11	..	16	7.00	3.00	5.00	....
Binder, Theodore	Wagon	186	224	15	4.60	3 60	4.10	....
Bowman, H. C	Wagon	496	303	18	5.80	1.70	3.65	1
Boecher, Henry	Depot	439	222	3	5.70	4 00	4.85	....
Bentz. George	Depot	451	219	5	5.40	3.50	4.45	....
Buhrmaster, C. H	Wagon	......	358	19	5.40	3.40	4.40	....
Brooks, H. E	Hand	....	..	......	....	.....	....	....
Dailey, C.	Wagon	4	220	7	5.60	3.90	4.75	....
Duckstrien, F.	Wagon	325	......	15	4.80	3.20	4 00	....
Davis, M. H. Milk Company	Store	518	. .	6	5.20	3.30	4 25	....
Eggleston, Charles	Depot	429	357	5	5.00	3.70	4.35	....
Ernst, F.	Wagon	184	31	13	4.20	3.30	3.75	. .
Ernst, C. G.	Wagon	410	218	33	6.00	2.20	4.10	...
Grabencamp, F	Store	5	30	7	5.20	3.30	4.25	....
Glickson, M	Store	486	..	1	6.00	6.00	6.00	....
Hacker, A	Wagon	9	168	17	5.20	3 00	4.10	....
Hall's Jersey Dairy	Wagon	465	169	9	4.40	3 70	4.01	....
Hartman, K	Store	345	. . .	3	4.60	3 80	4.20	....
Haskell, C L.	Wagon	70	33	9	4.70	3 50	4 10	....
James, Joe	Wagon	419	355	16	4.20	3.30	3.75	...
Johnson, C. A	Wagon	8	37	9	4.10	3.00	3.55	....
Kestner, H. C	Wagon	405	......	22	5.40	3.10	4.25	....
Leak, George S	Wagon	452	......	18	5.20	3.00	4.10	....
Leak, H. D.	Wagon	3	.....	15	4.20	3.00	3.60	....
Lentl, A	Wagon	515	......	13	4 80	3.40	4.10	....
Lindholm, H.	Depot	513	34	3	4.30	4 10	4.20	....
Lichtenberg, F	Wagon	1		9	4.80	3.40	4.10	....
Merlahan, D.	Depot	339	221	4	4.60	3.30	3 85	...
Parsons, F. M	Wagon	448	36	38	6.00	3.20	4.60	....
Pratt, Charles	Wagon	6	.	.....	......	....	.	...
Person, Nels	Hand	....	......	...	....		......	....
Sutton, M C.	Wagon	..	.....	2	4.80	4 60	4.70	...
Schupp, J. W	Store	488	352	2	6 00	5.40	5 70	...
Sourine, B	Wagon	2	33	9	4 40	3 60	4.00	....
Swords, E. T	Wagon	256	...	29	5 40	3.20	4.30	...
Sommerfield, William	Depot	438	29	1	3.20	3.20	3.20	....
Schwanker, Charles	Depot	487	223	9	5.60	3 40	4.50	....
Schwanker, Henry	Wagon	..	359	8	6 00	3.40	4.70	....
Smith, E. H.	Wagon	48	......	......	......		.	....
Tennity, E. J	Wagon	502		17	5.40	3.10	4 25	....
Upton, J. C	Depot	428	353	5	5.20	4 00	4 60	....
Van Winkle, O. G	Wagon	344	304	11	3 80	3.00	3.30	....
Vaughn, S. T	Wagon	326	....	26	6 00	2.10	4.50	1
Vogelsang, H	Wagon	547	......	11	4.40	3.40	4.40	...
Wotten, J. T	Wagon	10	35	8	5 30	3.90	4.60	...
Wuellner, Fred	Wagon	185	356	13	5 30	3.30	4.30	....
Total			......	514	5 40	3.30	4.19	2

CEDAR RAPIDS.

NAME.	MANNER OF SELLING MILK	Permit number for 1897.	Permit number for 1898.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
Alt, L. W.	Wagon	531	228	7	4 60	4 00	4.30	....
Benner, F	Wagon	102	173	9	4.60	2 20	3.40	1
Brock, R E.	Wagon	166	360	4	5.00	4.40	4.70	....
Bunger, E. W.	Wagon	98	47	8	4.80	4.00	4.40	...
Bear, W. T. S.	Wagon	882	170	11	4.80	4.20	4.50	....
Berry & Bear	Wagon No. 1	100	42	8	4.40	3 80	4.10	....
	Wagon No. 2	101						
Buch, Carl	Wagon	461	......	3	4.20	3.80	4.00	....
Clarke, James	Depot	225	.....	5	4 20	3.80	4.00	....
	Wagon	546	......	5	4.00	3.80	3.90	....
Clarke, George A.	Wagon	605	305	......	......			..
City Creamery	....	...	....	3	4.50	3.20	3.65	....
Davis, C. H	Wagon	340	...	1	4.00	4.00	4.00	....
Dockery, A	Depot	506	.....	12	4 40	3 00	3 70	....
Groat, Paxton	Depot	557	......	3	4 40	3.80	4 10	....
Hosmer, W. O	Store	604	......	2	3 80	3.20	3.50	...
Height, Frank	Wagon			......			......	....
Johnson, A	....	587		6	4.00	3.20	3.60	....
Klinger Bros	Wagon	35	40	8	4.40	3 40	3 90	...
Kilmeyer, F	Wagon	312	....	6	4.80	3.40	4.10	....
Leusch, W	Wagon	.....	..	10	4.40	3.00	3.70	....
Ling, A.	Wagon	279	225	6	5.00	4 20	4 60	....
Listerberger, I. G.	Wagon	48	41	7	5.00	3.80	4.40	....
Leusch, John	....			.....	......	..	......	....
McDowell, E. E	Wagon	133	171	13	4.40	3.40	3.90	...
Miller Bros	Wagon	74	307	10	5.00	3.20	4.10	....
Prynells, W	Depot	556	46	4	4.00	3.60	3.80	....
Pisney, Frank	Depot	250	....	7	4.80	3 20	4.00	...
	Wagon	251						
Patman, George	Wagon	361		2	4.20	.....		..
Porter, J. S.	Wagon	295	174	8	5.20	3.60	4.40	....
Porter, J. S.	Depot	615	175	4	5.00	3.60	4.30	..
Parks, G. W	Store	131	308	14	4.60	3.20	3 90	...
Post, O C.	Store	600	212	....				....
Richmond, E.	Wagon	17	314	4	4.60	4.40	4.50	....
Richmond, N.	Wagon		362	...	.....	.	.	....
Robb Bros	Wagon	248	.....	18	5.40	3.00	4.20	....
Reynolds, D. W	Wagon	99	44	11	5.00	2.80	3 90	1
Rawson, J. R.	Wagon	474	226	10	4 40	3.80	4.10	...
Rawson, J. R.	Store	492	227	......		.	.	....
Rooks, J. H.	Wagon	......	..	2	4.00	3 00	3.50	....
Smith, A. H	Wagon	235	45	5	4.50	3.20	3.85	....
Smith, H. G	Wagon	271	179	6	4.80	3 80	4 30	....
Sloan Bros	Wagon	470	178	4	4.40	3 60	4 00	....
Strusak, John	Depot	619	48	2	4 00	3.80	3 90	....
Thompson, Tom	Wagon	132	261	5	4.40	3.20	3.80	....
Usher, J. S.	Wagon	338	43	11	5.00	3.80	4.40	....
Williams Bros.	Wagon	310	172	4	5.20	4.00	4 60	....
Wohen, J.	Store	356	309	6	4 80	3.40	4 10	....
Wendler, T.	Wagon	484		8	4.00	3.00	3 50	....
Wilant, W. T.	Wagon	501	180	4	4.80	4.00	4.40	.. .
Wilant, T. N	Wagon	501	180	...	......	......	......	....
Total.	....			313	5.00	3 50	4 03	2

CLINTON.

NAME.	MANNER OF SELLING MILK	Permit number for 1897.	Permit number for 1898.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
Anderson, W. O	. . ..	.. .	......	......	....		...	....
Clinton Cream depot	Depot	519	.....	......	.		...	....
Bach, John	Wagon	447	235	9	3.80	3.00	3.40	....
Baer, J.	Wagon	396	......	9	4.00	3.20	3.60	....
Boynton, O. L	Wagon No. 1	259	365	9	4 30	3.30	3.80	....
Boynton, O L	Wagon No. 2	....	.....	7	4 30	3.00	3 65	....
Boynton, O. L	Wagon No. 3	.	......	......	......	......		...
Capion, C. F	Wagon	273	229	9	4.60	3 20	3 90	...
Carpenter, P	Wagon	324	182	8	4 00	3.30	3 65	...
Clausen, R	Wagon	130	55	10	3.80	2.60	3.20	1
Everman, H	Wagon	392	313	6	4.00	3.20	3 60	....
Fanger, H	Wagon	459	238	6	4.20	3.50	3 85	....
Freda, M. C.	Depot	227	.....	6	5.50	3.50	4.50	....

CLINTON—Continued.

NAME.	MANNER OF SELLING MILK.	Permit number for 1897.	Permit number for 1898.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
Fitch, H	......	......	......	7	4.60	3.90	4.25	....
Gertzen, D.	Wagon	281	234	9	4.40	3.50	3.95	....
Gideonson, John	Wagon	276	232	8	4.40	3.40	3.90	....
Grumstrup, Paul	Wagon		236	3	4.80	3.20	4.00	....
Heath & Stockwell	Wagon	103	51	8	4.20	3.40	3.80	....
Howes, P. L	Wagon	......	312	3	4.30	3.80	4.05	....
Heath, Clinton.	Wagon	......	57	......	......	......	......	....
Johnson, Nels	Wagon	71	52	6	4.00	3.40	3.70	....
Johnson, Gus	Wagon	226	181	6	3.80	3.00	3.40	...
Krogman, Frank	Wagon	239	363	8	4.80	3.20	4.00	....
Kennedy, John J	Wagon	403	......	6	5.60	3.00	4.30	....
Miller, M. C	Wagon	328	230	9	4.60	3.60	4.10	....
Morrisey, Owen	Wagon	397	364	5	3.90	3.20	3.55	..
Nissen, C	Wagon	294	243	7	4.10	3.30	3.70	....
Neilson, C	Wagon	245	54	7	4.90	3.70	4.30	....
Oleson, S	Wagon	104	49	7	4.00	3.00	3.50	...
Oleson, J. S	Wagon	238	185	9	4.70	3.60	4.15	....
Paulson, Carl	Wagon	171	239	7	4.80	3.50	4.15	....
Person, Nels	Wagon	106	50	4	4.40	3.30	4.10	....
Peterson, C.	Wagon	339	183	12	4.10	2.20	3.15	1
Rasmussen, F	Wagon	554	237	7	4.00	3.20	3.60	....
Reter, J.	....		310	7	4.20	2.70	3.45	1
Schmidt, P	Wagon	105	53	7	4.00	3.00	3.50	...
Sessor, Charles	Wagon	243	184	9	4.60	3.20	3.90	....
Simmons, S.	Wagon	288	231	6	4.60	4.00	4.30	...
Thompson, C.	Wagon	352	311	5	4.70	3.60	4.15	....
Thompson, F. S	Wagon	......		1	3.80	3.80	3.80	....
Total	....		......	268	4.60	3.40	3.79	3

COUNCIL BLUFFS.

NAME.	MANNER OF SELLING MILK.	Permit number for 1897.	Permit number for 1898.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
Arnold, P. J	Wagon	313	241	27	4.40	3.30	3.91	....
Applequist, O. N	Wagon	555	7	27	4.60	2.80	3.95	1
Baker, W. W	Wagon	234	187	13	4.10	3.50	3.72	....
Easdale, E	Wagon No. 1	158	59	42	4.60	3.30	3.77	....
Easdale, E	Wagon No. 2	159	60	14	4.20	3.30	3.66	....
Ellsworth, J. L	Wagon	316	368	25	4.90	3.10	4.08	....
Ellsworth, A. C	Wagon	315	58	30	4.60	3.20	3.75	...
Gronewig, W. A	Wagon	593	56	5	6.00	4.10	4.88	....
Green, Chas	Wagon	390	57	21	4.80	2.60	3.96	...
Johnson Bros	Wagon	233	6	24	4.40	3.40	3.69	....
Kissel, W. H	Wagon	583	243	11	5.60	3.30	4.88	....
Leonard, Henry	Wagon	377	369	37	5.60	3.20	4.30	....
Letner, C. F	Wagon	317	4	27	4.80	3.00	3.72	....
Martin, H. H	Wagon No. 1	301	9	30	4.60	3.00	3.45	....
Martin, H. H	Wagon No. 2	302	10	21	4.20	3.10	3.82	....
Marquadt, Mrs. V.	Wagon	107	62	16	5.00	3.40	3.87	....
Nelson, P.	Wagon	214	5	20	4.20	3.40	3.76	....
Nelson, N. P	Wagon	314	240	29	4.40	3.20	3.79	....
Pratt, C. F	Wagon	318	367	23	4.00	2.70	3.60	1
Ray, James.	Wagon	312	61	19	4.80	3.80	4.25	....
Reed, A. H.	Wagon	467	242	23	4.60	2.40	3.79	1
Robinson, Mrs. Mary M	Wagon	53	188	14	6.40	4.70	5.40	....
Scherer, Chas	Wagon	215	186	23	5.00	3.50	4.20	....
Skodesholm, Otto	Wagon	224	8	24	4.30	3.20	3.83	...
Total	....		....	595	4.80	3.30	3.80	3

DAVENPORT.

NAME.	MANNER OF SELLING MILK.	Permit number for 1897.	Permit number for 1898.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
Abraham, H. T.	Wagon	138	245	11	4.00	3.40	3.66	....
Armil, J	Wagon	291	......	7	4.30	3.50	3.78	....
Arp, Hans	Wagon	39	73	6	4.10	3.00	3.78	....
Atkinson, George S	Wagon	564	197	5	6.60	3.80	5.06	....
Berger, F. E	Wagon	498	192	6	3.90	3.30	3.57	....
Beyer, B	Depot	40	75	2	3.70	3.60	3.65	....
Blumer Bros.	Wagon	82	64	9	4.00	3.00	3.75	....
Booth, C. H	Wagon	......	......	3	4.00	3.50	3.80	....
Bruhn, H	Wagon	193	246	3	4.00	3.50	3.80	....

DAVENPORT—CONTINUED.

NAME.	MANNER OF SELLING MILK	Permit number for 1897.	Permit number for 1898.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
Barraclough, George	Wagon	244	316	7	4.80	3 40	3.88	....
Bruhn, L	Depot	378	.....	11	4.00	3 20	3.53	....
Buhman, W	Wagon	551	......	7	3.70	2 70	3 26	2
Bridwell, F. O.	Wagon	575	......	8	4.60	3 60	4 30	....
Christiansen, C	Wagon	81	76	7	3 90	3.60	3 70	....
Coglin, Thomas	Wagon	36	71	10	4.20	3.60	4.00	....
Cowiezell, John	Wagon No. 1	261	......	..	..	......	.	....
Cowiezell, John	Wagon No. 2	262	......	14	4.00	3 00	3.76	....
Cowiezell, Jacob	Wagon	411	252	15	4.00	3.00	3.71	...
Carstenson, Aug	Wagon	504	190	3	3.60	3.20	3.40	...
Dismer, W	Wagon	323	326	10	4.60	3 40	4 00	...
Drier, F	Wagon	407	322	10	4.20	3.00	3 58	....
Eckstien, Fritz	Wagon	......	......	11	3.80	3.00	3 42	....
Eggers, Hans.	Wagon	......	......	....	....	...	.	. .
Flambo, G	Wagon	..	.....	3	4.00	3 20	3.45	....
Gankler, Joe	Wagon	135	3	8	4 20	3 20	3 60	....
Gankler, John	Wagon	135	......	3	4.20	3.60	3 80	...
Goetsch, H. J.	Depot	110	196	6	4.80	3 80	3.96	....
Gruenewald, Mrs. H	Wagon	......	......	1	3.80	3.80	3 80	....
Haase, H	Wagon	62	195	9	4.00	3.10	3 66	....
Herriman, H.	Wagon	529	......	10	3.70	3 10	3.56	....
Harrison, J. W.	Wagon	58	319	4	4.10	3.60	3 85	....
Harmes, Henry	Wagon	258	317	11	4 00	3 30	3 66	....
Hemmings, Mrs. D.	Depot	441	......	3	4.00	3 80	3.93	....
Heuer, John	Wagon	32	199	10	3.80	3.40	3.60	....
Heuer, Claus	Wagon	76	65	21	4.00	2.50	3 07	2
Hinselman, H	Wagon	197	314	7	4.60	3 50	3 64	....
Haller, Charles L.	Wagon	......	......	1	3.90	3 90	3.90	...
Juergensen, J	Wagon	128	325	10	4.00	3 00	3.63	....
Kelling, Fritz	Wagon	257	194	10	4.00	3 00	3 65	....
Kellogg, H.	Wagon	254	200	7	4 00	3.40	3.67	....
Koch, John	Wagon	363	323	9	4.40	3.70	4 13	....
Lange, J	Wagon	191	255	11	4 60	2 70	3.79	2
Laible, J. F.	Depot	404	253	23	4.40	2.80	3 65	1
Larson, A	Wagon	573	371	8	4.00	3.20	3 72	....
Maves, John	Wagon	.. ..		6	4 80	3.10	3 90	....
Mess, Henry	Wagon	300	244	4	3 40	3.20	3.26	....
Mueller, A.	Wagon	333		9	3.80	3.10	3.53	....
Newman, E. H.	Wagon	473	63	7	4 00	3.60	3 84	....
Nagel, H	Wagon	306	320	14	4.60	3 30	3 66	....
Nichols, Mrs. J. C	Wagon	119	.	1	3 40	3.40	3.40	....
Peterson, P	Wagon	351	191	6	3 90	3 00	3.45	....
Prignitz, A	Wagon	194		9	4.80	3.50	3 90	....
Peterson, Hans	Wagon	193	72	7	3.70	3.20	3.38	....
Prinz & Moffatt	Wagon	375	327	11	6.20	3.20	3.82	....
Peters, O.	Wagon	497	249	7	4 80	3 80	4 17	....
Piels, John	Depot	..	370	3	4.00	3.20	3.60	....
Raum, Max.	Wagon	137	68	13	4 00	3.00	3.50	....
Ruch, P.	Wagon	108	.	7	4.00	3 00	3.60	. ..
Raum, Fred	Wagon	602	328	3	4 20	3.50	3.86	...
Ruchman, O.	Wagon	236	248	11	4.00	3.00	3.56	....
Rohm, H. W	Wagon	549	321	6	3 80	3.50	3 62	....
Rau, Lenhard	Wagon		70	8	4 00	3.40	3.73	....
Sivertsten, O. F	Wagon	242	.....	10	4 00	3 20	3.51	..
Schladitz, A.	Wagon	78		11	4.60	3.00	3.65	..
Schmidt, John	Wagon	18	69	10	3.90	3.00	3.53	....
Schnoor, O	Wagon	37	67	7	4.20	3.40	3.77	...
Schrum, Max.	Wagon	297	......	10	3 80	3.10	3 66	....
Springhorn, P	Wagon	466	.....	10	3.80	3 40	3 76	....
Schoening Bros	Wagon	550	189	14	3.80	2 80	3 40	2
Stuhr, Theodore	Wagon	......	201	7	4.00	3 20	3.72	....
Thiessen, Paul	Wagon	241	318	10	4.60	3 60	4 08	....
Von Stozentin, ——	Wagon	......	.....	2	3.80	3 60	3.70	....
Woehlk, J	Wagon No. 1	79	74	.....	......	......	.....	....
Woehlk, J	Wagon No. 2	80	....	13	4.40	3.10	3 70	....
Wendhausen, H	Wagon	127	315	9	3 70	3.30	3 48	....
Willers, H	Wagon	195	247	12	3 80	3.20	4 03	....
Wiese, R	Wagon	286	......	6	3.80	3 40	3.54	....
Wilkins, A. F	Depot	.. ..	......	4	3 80	3.50	3.60	...
Wollf, W. W	Wagon	520	.....	6	3 60	3.00	3 27	....
Zarn & Flambo	Wagon	109	250	12	4.00	3.00	3 58	...
Zinger, George	Wagon	329	.....	13	4 40	3 00	3.53	....
Total	......	.....	.....	663	4.60	3 20	3.80	9

DES MOINES.

NAME.	MANNER OF SELLING MILK	Permit number for 1897.	Permit number for 1898.	Number of tests	Highest test.	Lowest test.	Average test.	Number below standard.
Arthur, R. C	Wagon	180	..	25	5.00	2.60	3.78	2
Anderson, A	Wagon	30	21	10	4.60	3.70	4.07	....
Adamson, Jane	Wagon	......	158	..		......		....
Bennett, W. P	Wagon		.....	5	5.00	2.90	3.60	1
Bennett, R. S.	Wagon	427	.....	18	4 40	3.50	4.00	....
Blackman, F. M	Wagon	52	274	17	4.20	3.30	3 75	....
Bragdon Bros	Wagon No. 1	83	...	20	5.00	3 30	3.83	....
Bragdon Bros	Wagon No. 2	84	...	14	4.20	3.20	3.60	....
Burke, U. J	Store	543	..	11	4.50	3.20	3 60	...
Berger, H	Wagon	308	145	2	4 50	3 40	3 95	....
Bergenson, Andy	Wagon	......	.	6	4.00	2.70	3 45	1
Bickley, H. T	Store	559	....	10	4.30	3.20	3.78	...
Bailey, J. W	Wagon	..	.	8	3.70	2.20	3.65	1
Campbell, Ed	Wagon	290	281	15	4.30	2.90	3.58	1
Churchman, W. W	Wagon	153	280	15	4.90	3.10	3.67	....
Clark, H. S	Depot	179	......	8	4.70	3.50	3.74	....
Cruinkshank, J	Wagon	342	.	26	5.10	2.80	3.89	3
Carter, W. F	Wagon	288	77	19	4.50	3 00	3.80	....
Chapman, A. A	Depot	598	.....	6	4.10	3.60	3 90	..
Calkins, O. H	Depot	533	......	10	5.00	2.50	3.23	1
Dunne, E. B	Depot	15	217	4	4.50	3.50	3.90	...
Dunne, E B	Wagon	14	216	15	4 80	3 00	3.92	...
Dippell, Louis	Store	154	79	10	4 30	3 40	3.83	....
Dawson, J. J	Wagon	.	160	4	4.20	3.00	3.70	..
Ehle & Ehle	Wagon	181	17	13	5.20	2 60	3.98	1
Ehle & Ehle	Depot	182	18	19	5.30	2.60	3.71	1
English & Bahl	Wagon	......	......	5	4.30	3.70	4 04	....
Fair Lawn Dairy	Wagon	......		8	4 30	3.10	3.60	....
Fair Lawn Dairy	Wagon	..	......	3	4.70	3.30	3.61	....
Fitzgerald, Kate.	Wagon	468	......	24	5.20	2.80	3.76	1
Filson, L	Wagon	611	....	5	4 60	2.90	4.12	1
Felt, G W	Wagon	331	....	16	4.90	2 80	4.01	1
Flynn, Thomas	Wagon	376	.....	20	4.10	3.30	3.70	....
Geil, F M	Wagon	190	277	18	4.60	3.30	3.90	..
Good, W E.	Wagon	583	202	15	4.30	2.70	3.70	1
Gordon, William	Store	327	217	10	4.50	2.10	3.91	2
Gordon, A. H	Wagon	.....	149	4	3.80	3 30	3.45	...
Gordon, J. R	Wagon	547	205	7	3.00	3.00	3.00	....
Gordon, J. R	Store	545	206	7	4.40	3.10	3 73	....
Gay, C C	Store	610	.....	4	4.10	3.00	3.40	...
Graham, M. J	Store	319	.....	10	4 60	3.60	3.80	....
Garton, S. B	Store	.	.	3	3.40	2.80	3 10	1
Harless, W. C	Wagon	469	213	18	4.50	3 30	3.91	....
Harding Creamery Company	Depot	399	271	11	4.00	3.20	3.63	...
Hawks Bros	Store	517	212	13	5.30	3.10	3 64	...
Hockersmith, J. S	Store	149	156	10	4.30	3 10	3.61	...
Howell, W. C.	Wagon No. 1	55	19	12	4 50	2.60	3.58	1
Howell, W. C	Wagon No. 2	616	20	7	4.50	3.20	3.57	...
Hervey, William	Wagon	129	27	5	4.20	3.30	3.48	...
Homan, O M	Store	613	......	7	3.50	2.50	3 20	1
Hollingsworth, Mrs.	Store	617	165	5	5.00	3 10	3.59	...
Hawkeye Milk Company	Wagon No 1	......	......	23	5.00	1.80	3.71	1
Hawkeye Milk Company	Wagon No. 2	......	......	7	4.10	3.20	3.70	....
Hawkeye Milk Company	Wagon No. 3	......	....	12	4.50	3.00	3.72	...
Hawkeye Milk Company	Depot	......	.....	4	4.00	3 50	3 80	....
Iowa Dairy Company	Wagon No. 1.	.....	151	23	4.50	2.40	3.65	1
Iowa Dairy Company	Wagon No. 2	.....	152	17	6.50	2 70	3.83	1
Iowa Dairy Company	Wagon No. 3	......	153	5	4 30	2.40	3 40	1
Iowa Dairy Company	Wagon No. 4	.....	154	3	3.50	3.10	3 40	....
Iowa Dairy Company	Depot	.....	155	18	4.80	2 80	3.72	1
Izzard, H. W	Wagon	.	.	4	4.00	3.40	3.85	....
Johnson, C. R	Wagon	434	162	19	4.70	3.10	3.73	....
Jones, L	Wagon	157	.. ..	20	5.20	3 10	3.60	..
Knapp, M	Store	608	....	6	3 50	2.70	3.13	1
Kampinsky, J.	Wagon	162	272	4	3.80	2.80	3 51	1
Lentz, M. M	Wagon	......	.....	1	3.60	3 60	3.60	....
Lee, A. A	Wagon	609	26	7	4.00	2.50	3 40	1
Lane, A. C	Wagon	118	22	15	5.50	3 00	3.83	....
Lane, M. M	Wagon	.....	....	4	4.00	3.00	3.15	..
McConnell's Dairy	Wagon	.....	.....	7	4.50	3.80	4.30	...

DES MOINES—CONTINUED.

NAME.	MANNER OF SELLING MILK.	Permit number for 1897.	Permit number for 1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
Maris, E. B	Depot	....	1	2	4.30	3 90	4.10	....
Malone, J.	Wagon	..	....	7	4.10	2.50	3.47	1
Miller, M. J	Wagon	435	276	7	4.50	2.70	3.72	1
Miller, M. H	Store	417	....	4	4.00	2.60	3.38	1
Monroe, Sam	Wagon	....	....	7	5.00	3.40	4.03	....
Mueller, J. M.	Wagon	304	..	16	4.70	3.20	3.54	....
McKowan, G. W	Wagon	548	143	11	4.40	2 60	3.78	1
Moon, E. E.	Wagon	....	203	14	4.50	1.50	3.46	1
McDill, O. W.	Wagon	....	....	....		..	....	....
Miloslowsky, J.	Wagon	....	....	1	3.60	3 60	3.60	....
Nichols, G. A. R.	Wagon		278	17	4.40	3.20	3.67	....
Nelson	Wagon	532	....	1	3.60	3 60	3.60	....
Oleson, J.	Wagon	51	25	25	4.70	3.00	3 57	....
Payton, W. W	Wagon	....	....	16	5.30	3.50	4.23	....
Pickering, O. B	Wagon	172	....	10	4.40	3.50	3.93	....
Proctor, George	Wagon	348	....	8	4.10	2.80	3.68	1
Pugh, Mrs. H. A	Depot	418	....	10	4.50	2.80	3.49	1
Page, G. D	Wagon	285	....	....	....	....	...	....
Painter, John	Wagon			....				...
Quist, Frank	Wagon	266	207	20	4.70	2.80	3.87	1
Quist, Andrew	Wagon	....	150	17	4.60	2.80	3.72	1
Randolph, W. E. F.	Wagon	....	159	....		....	....	....
Ring, F. M	Wagon	450	..	23	4.50	3 20	3.81	....
Rogers, R.	Store	269	28	10	4.80	3 10	3.74	....
Ricketts, W. E.	Wagon	152	163	16	4.10	3.30	3.60	....
Reynolds, Mrs. I. F	Wagon	....	....	....	....	....		...
Redman, C.	Wagon	551	....	12	4.50	2.70	3.65	2
Robb, George F	Wagon	....	....	12	4.50	2.50	3.35	4
Robertson, Robert	Wagon	....	....	2	4.80	4.10	4.50	....
Sanders, H.	Store	391	80	9	4.50	3.30	4.00	...
Schlenker, George F.	Wagon	31	..	...			....	....
Schlenker, William	Wagon		38	5	4.50	3.20	3.90	....
Schoenfeldt, G.	Wagon	448	273	5	4.00	3.50	3 60	....
Scott, A. W. & Co	Store	268	78	8	5.00	3.70	4.38	....
Siders, H. A	Depot	332	147	7	4.10	3.60	3 91	....
Smith, J. S.	Wagon	147	39	15	5 00	3 10	3.53	....
Sanders & Johnson	Store	421	....	4	4.60	3 50	3.90	....
Stookey, D. M	....	..	..	13	4.80	3.00	4.14	....
Stookey, D. M.	Wagon	155	148	18	4.60	3.40	4 08	....
Strickland, L. M	Wagon	284	208	17	5 00	3.60	4.37	....
Stubbs, William	Wagon No. 1	174	23	10	4.30	3.60	3 83	....
Stubbs, William	Wagon No 2	175	24	8	4.40	3.70	3.87	...
Starks, J. H	Wagon	151	204	22	4 60	3 10	3.80	....
Shoemaker, H. S	Wagon	.	145	17	4.50	3.50	3.83	....
Shoemaker, H. S	Wagon	454	209	12	4.60	3.20	3.79	....
Terry, A.	Depot	455	210	10	4.80	3.10	3.93	....
Terry & West	Wagon	364	211	4	3 50	3.40	3.48	....
Thomas, W. H	Wagon	462	...	12	5.00	2.50	3.68	1
Tyler, J.	Wagon	164	270	17	5.10	3 30	4.00	...
Tyler, Mrs. C. A.	Wagon	.	....	1	3.40	3.40	3.40	....
Vail's Dairy	Store	430	....	....			....	....
Vail's Dairy	Wagon	431	....	4	4.50	3.70	4.25	.
Vail's Dairy	Depot	.	.	6	4.10	1.70	3.32	2
Vander Linden, L. J.	Store	125	161	12	4.10	3 00	3.55	....
Von Stueben, J. P.	Wagon No. 1	423	....	21	4.80	3 00	3.66	....
Von Stueben, J. P	Wagon No. 2	424	....	16	4.40	3 20	3.90	....
Von Hyning, W. V.	Wagon	....	.	8	4.00	3 30	3.60	...
West, F	Wagon	176	268	18	4.80	3.30	3.77	....
West, C. P	Wagon	177	269	1	3 70	3.70	3.70	...
Wessinger & Co	Store	408	279	10	4.90	3 40	3.77	....
Williamson, James	Wagon		....	....	....			....
Wollbridge, F	Wagon	347	..	16	4.40	3.00	3.71	...
Wood, W. T.	Store	449	275	8	4.10	3 10	3 71	...
Wormlesdorf, T. H	Store	400	167	6	3.90	3.10	3 65	....
Wilson, D. F. & Bro	Wagon	537		16	4.70	3.10	3.76	....
Windsor, J. H	Wagon	282	....	10	4.30	3.10	3.75	...
Welker & Co.	Wagon	...		3	4 10	3.40	3.82	...
Young, E. B	Wagon	85	157	7	5.00	3.00	4.35	....
Young Bros	Wagon	349	..	9	4.30	3 00	3 90	...
Zinn, Mrs. D.	Store	330	166	6	4.00	2.10	3.25	2
Total	....	....	....	1,591	4.80	3.60	3.72	44

DUBUQUE.

NAME.	MANNER OF SELLING MILK.	Permit number for 1897.	Permit number for 1898.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
Adam, Mike	Store	432	265	9	4.40	3.20	3.90	...
Albrecht, G	Wagon	..	......	13	4.20	3.00	3.67	....
Avery, Henry L	Wagon	464	......	..	...	...	......	....
Barrett, John	Wagon	521	....	8	3 40	3.00	3 20	....
Bolzien & Bulwer	Wagon	282	267	12	4 40	3.20	4.00	....
Brenke, O.	Wagon	522	......	11	4.80	3.20	4.03	....
Buckingham, T	Wagon	336	373	9	5 00	3.30	3 80	....
Buckingham, T	Wagon	337	......	8	4.20	3 80	3.80	....
Beadle. Chas	Wagon	562	85	4	4.60	3.60	4.10	....
Belpky, I	Wagon	.	256	....			...	....
Conzett, A	Wagon	293	87	7	5.20	3.40	4.75	...
Cushing, Mell	Wagon No. 1	509	......	9	4.20	3.20	3.57	....
Cushing, Mell	Wagon No. 2	510	......	12	4.30	3 60	3.86	....
Cushing. Mell	Depot	511	......	7	4.00	3.20	3 78	....
Daly, F	Depot	124		7	4.40	3.40	3.80	....
Duggan, James T	Wagon	558	262	9	4 40	3.00	3.85	...
Ensler, Mrs. M	Store	292	92	10	4.40	3.40	3.95	....
Elgin, M	Wagon	...	......	7	4.40	3 60	3.85	....
Fluetsch, J. & Sons	Wagon No. 1	120	88	12	4.20	3.20	3.55	....
Fluetsch, J. & Sons	Wagon No. 2	121	89	8	4.80	3.20	4.14	....
Fluetsch, J. & Sons	Depot No. 1	122	90	......		......	......	...
Fluetsch. J. & Sons	Depot No. 2	123		......	.....	......	......	....
Farrell, F	Wagon	.. .	......	9	5.00	3.40	3.85	....
Frelan, C	Wagon	......	......	2	4.60	4.20	4.40	....
Gonler, A	Wagon	......	......	3	3.80	3.20	3.55	....
Gonler, B	Wagon	....	....	1	3.60	3.60	3 60	....
Gadient, John	Wagon	89	86	11	4.20	3.60	3.89	....
Gartner, A	Wagon	456	361	12	4.20	3 00	3.45	....
Hick, M	Wagon	...	......	10	4.20	3 00	4 00	....
Hackers, A.	Wagon	88	......	10	4.60	3.20	3 83	....
Heinne, E	Wagon No. 1	541	376	11	4.60	3.20	3.95	....
Heinne, E	Wagon No. 2	542	377	10	4.80	3 60	4.09	....
Herron, H. L	Wagon	247	.....	11	5.20	3.20	4.15	....
Hoferlin. J	Wagon	406		9	4.60	3.40	4.11	....
Howart & Pressly	Wagon	......	......	1	3.40	3.40	3.40	....
Kutsch Bros	Wagon	....	.. .	6	4 60	3.60	3.90	....
Jecklin, J. H	Wagon No. 1	45	375	10	4.80	3.20	3.92	....
Jecklin, J. H	Wagon No. 2	46	..	11	4 00	3.80	3.95	....
Knockle, A	Wagon	229	259	11	5.00	3.00	3.88	....
Meyer, H	Wagon No. 1	86	93	10	5.00	4.20	4.77	....
Meyer, H	Wagon No. 2	87	94	8	6.40	4.30	4.74	....
Mueller, Emil C	Wagon No. 1	217	82	11	4.80	3 60	4.03	....
Mueller, Emil C	Wagon No. 2	218	83	13	4.40	3 20	3 91	....
Mueller, Emil C	Depot	219	84	10	4.60	3.80	4.16	....
Mussehl, F	Wagon	401	257	4	4.20	3.20	3.86	....
Miller, J. O	Wagon	370	266	11	4.60	3.60	3.95	....
Mettel Bros	Store	446	258	10	4.40	3.60	4.00	....
Metcalf, R.	Wagon	536	. 331	8	4.10	3.60	3.85	....
Park Grocery Company	Store	444	.	11	5.00	3.60	4.05	....
Pfol, F. J.	Wagon	495	263	4	4.20	4.00	4 10	...
Paley, A.	Wagon	200	81	6	4.20	3 00	3.50	....
Peysl, Rudolph	Wagon	198	260	7	4.80	3 40	4.25	....
Omna, J	Wagon	......	......	1	4.00	4.00	4.00	....
Seeman, P	Wagon	199	100	10	5.00	3.80	4.11	....
Sheridan, B	Wagon	272	91	9	4.60	3.20	3.97	....
Spenetzky, A	Wagon	426	374	8	5.00	3.80	4.42	....
Supple, M. F	Depot	201	......	2	3.80	3.80	3.80	....
Sutter, L	Wagon	445	... .	8	4.20	3.20	3 72	....
Schlegal, M.	Wagon	..	95	11	4.40	3.60	4.00	....
Thorman, G. A	Wagon No. 1	393	96	10	4.60	3.20	3 88	....
Thorman, G. A	Wagon No. 2	394	97	9	4.40	3.80	3.97	....
Thorman, G. A	Depot	395	98	6	4.20	3.80	4.03	....
Walker, C. H.	Wagon	90	372	11	4.20	3.20	3.98	...
Willard, A	Wagon	249	329	.....		......	....	....
Ziegler, C.	Wagon	56	330	9	5.00	3.40	3 88	....
Total	....	....	......	546	4 70	3 40	3 97	....

KEOKUK.

NAME.	MANNER OF SELLING MILK.	Permit number for 1897.	Permit number for 1898.	Number of tests.	Highest test.	Lowest test	Average test.	Number below standard.
Driffield, H.	Wagon	275	105	28	5 40	4.00	4.88	...
Emerson, M. E.	Wagon	362	.....	18	5.20	3.90	4.31	....
Hunt, R. A	Wagon	130	107	24	5.20	3.80	4.79	....
Hazen, A. D	Wagon	......	99	8	5.30	4 20	4.70	....
Keokuk Dairy Company	Wagon	333	378	24	5.40	3.40	4.41	....
Ketterson & Koss	Wagon	111	108	28	5.40	3.80	4.51	....
Knox, John	Wagon	202	.....	18	9.00	3.60	4 21	....
Lang, Fred	Wagon	49	104	19	5.10	3.60	4.28	....
Nelson, O. G	Wagon	...	106	28	6.00	4.30	5.17	...
Patterson, D	Wagon	405		27	6.00	3.70	5.06	....
Rein, Henry	Wagon	311	332	28	5.20	3.40	4.23	....
Safford, O. O	Wagon	34	103	24	5.20	3 40	4.50	....
Sample, J. L	Wagon	260	333	23	5.00	3.60	4.19	....
Schappach, W. J	Wagon	402	101	20	5.00	3 60	4.24	....
Weyland, W. G.	Wagon	590		12	6.00	3.40	4.54	....
Yenawine, H. W	Wagon	112	379	16	5.60	3.60	4.37	...
Total			...	352	5.20	3.60	4.44	....

MUSCATINE.

NAME.	MANNER OF SELLING MILK.	Permit number for 1897.	Permit number for 1898.	Number of tests.	Highest test.	Lowest test	Average test.	Number below standard.
Beegner, C	Wagon	262	114	24	4.80	2 40	3 75	1
Bierman, H. B.	Wagon	73	16	22	4.80	3.00	4 06	....
Dankert, John.	Wagon	114	12	16	4 80	4.00	4 47	....
Frick, M	Hand	..		14	6 20	2.60	4 31	1
Greenaway, Julia.	Depot.	189	113	7	4.60	3.40	4 00	....
Harris, O. H	Wagon	115	15	23	5.00	2.60	3 74	1
Luendecker, C	Wagon	220	11	22	6.60	1 60	4.23	1
Le Ferve, G. W	Wagon	69	14	22	5 80	3.20	4 39	...
Manly, M		..		1	4.20	4.20	4 20	....
Nagel, P. W	Wagon	584	116	18	6 00	3 40	4.25	....
Mittman Bros	Wagon	208	112	16	4.80	2.60	3 99	1
Oberhaus, S	Store	.....	109	1	4 20	4 20	4.20	..
Schwalm, H	Wagon	585	111	8	5.60	4.00	4.76	...
Thomas, J. J.	Wagon	252	108	8	3.80	3.80	3.80	....
Will, O. H.	Wagon	357	...	15	4.80	3 20	4.09	....
Will Bros.	Wagon	289	110	23	6.20	3.20	4 00	...
Wentermonte, B. K	Depot	140	115	5	5.40	3.60	4 52	...
Washburn, Frank	Wagon	453	117	6	4.00	3 40	3 70	....
Lake, P. B	Wagon	96	13	18	6.20	3 20	4.21	...
Total		......	.....	256	5.20	3.40	4 07	5

OTTUMWA.

NAME.	MANNER OF SELLING MILK.	Permit number for 1897.	Permit number for 1898.	Number of tests.	Highest test.	Lowest test	Average test.	Number below standard.
Bizer, T. F	Wagon	595	383	4	4 00	3.20	3.80	....
Condiff, D. E.	Wagon	204	124	12	5.10	3.70	4.29	...
Chrisman, W. P	Wagon	......	119	7	5.00	3.10	4 15	....
Daggert, E.	Wagon	335	385	12	4.60	3 10	3.98	....
French, Mrs E. K	Wagon	126	122	13	5.10	3 60	4 05	...
Harsh, J.	Wagon	221	118	12	8.20	3.40	5.00	....
Hutson, T. L	Wagon	341	382	12	5.80	3.80	4.72	...
Michael, B. F	Wagon No. 1	187	......	...	......		......	....
Michael, B. F	Wagon No. 2	188	......	12	6.80	3 10	5.10	...
Montague, H.	Wagon	253	380	11	6.80	3 60	4.78	....
Landon, W. N	Wagon	..	.. ...	4	4.70	3.10	3.76	....
Meredith, W. H. & A. P	Wagon	603	......	..	......		...	...
Johnson, O. E	Wagon	.. ..	......	4	4.70	3.80	4.17	....
Noble, T H	Wagon	298	121	13	5.60	3.10	4.46	....
Otterburg, M	Wagon	601	336	5	5.10	3.60	4 10	...
Rupe, J. A	Wagon	503	534	9	4.80	3.70	4.00	...
Simmons, H. O.	Wagon	340	384	13	6.80	3.80	4.53	...
Thornburg, T. M	Wagon	578	123	7	5.40	3.90	4.58	....
Total		......		177	5.40	3.40	4 42	....

SIOUX CITY·

NAME.	MANNER OF SELLING MILK.	Permit number for 1897.	Permit number for 1898.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
Baby Milk Dairy	Wagon	305	337	11	4.70	3 60	3.90	....
Bradstreet, C. O	Wagon	443	288	18	4.20	3.20	3.46	....
Bradstreet, T. E	Wagon	265	342	12	5 40	3.00	3.62	....
Bowman, H	Wagon	....	.	1	4.00	4 00	4.00	....
Clark, H. D	Wagon	386	387	13	5.40	3.00	4.04	...
Campbell, C. W	Wagon	593	....	8	4.80	3.80	4.03	....
Frisbie, W	Wagon	412	286	15	4.20	3.00	3.58	....
Franklin & Oleson	Wagon	413	391	12	4 00	3.00	3.63	....
Fetterson, A.	Wagon	141	294	7	4 00	3 40	3.63	....
Gilman, W. H.	Wagon	......	......	1	4 00	4.00	4.00	....
Hazen & Mix	Wagon	..	394	1	3.40	3.40	3 40	....
Hermann, W. M	Wagon No. 1	299	338	......	......	. ..		....
Hermann, W. M	Wagon No. 2	539	339	17	4 00	3.00	3 57	....
Heath, D. B	Wagon	92	181	12	4.40	3.00	4.02	....
Hansen, Anna	Wagon	527	298	5	4.00	3 00	3 58	....
Hansen, Louis	Wagon	.	......	4	4.40	3 40	3.70	....
Jensen & Freese	Wagon No. 1	476	.....	18	4.20	3.00	3.56	....
Jensen & Freese	Wagon No. 2	477	.....	11	4.60	3 20	3.75	.. .
Johnson, C.	Wagon	63		7	4 00	3.20	3 60	....
Johnson, A. R	Wagon	475	287	12	4 20	3 00	3.57	....
Kruman, L	Wagon	525	...	10	5.00	3 00	3.50	....
Lynn Bros.	Wagon	67	290	13	4 20	3.00	3.69	....
Lamb, W	Wagon	524	293	10	5.00	3 60	4.17	....
Mahoney, William	Wagon	528	389	11	4.40	3 20	3.91	....
McNamara, R. E	Wagon	372	388	12	4 20	3.00	3.51	....
Morgan, C. H	Depot	209	292	11	4.20	3 20	3.76	....
Moulin, W. H	Wagon	278	125	12	4.00	3 20	3.58	....
Newgoard, A.	Wagon	381	396	8	4.20	3.00	3 47	....
Oleson, F. & Son	Wagon	208	299	13	4.80	3 00	3.48	....
Olson, Eric	Wagon	233	297	5	4 00	3.00	3.20	....
Olson, Andrew	Wagon	....	386	2	3.60	3.00	3.30	....
Oven, F. M.	Wagon	..	395	2	3 60	3.00	3.30	....
Perrasso & Gambrino Bros	Store	321	300	13	4.40	3.20	3.82	....
Pfoff, L	Wagon	......	295	13	4 20	3 20	3 76	....
Perrin, E. E	Wagon	......	130	4	4.40	3.40	3.90	....
Ray, W. D	Wagon	498	.....	12	4.60	3.50	4.18	....
Reise, C. B.	Wagon	142	.....	8	4.00	3.00	3 45	....
Robinson, C. M	Wagon	66	......	9	5.00	4 00	4.57	....
Rowe, N. J	Wagon	526	393	12	4.40	3 00	3.50	....
Reynolds, C C	Wagon	91	.....	3	3 80	3.30	3 50	....
Solseth, A. H	Wagon	606	392	4	4.(0	3 50	3.82	....
Sheppard, M. J.	Wagon	330	301	12	3 80	3 00	3.57	....
Sherman, E. D	Depot	240	.....	10	4 80	3.40	4 03	....
Sorrensen, C	Wagon	384	343	16	4.50	3 00	3 48	....
Storrer, A. W.	Wagon No. 1	60	26	12	3.90	3 20	3 66	....
Storrer, A. W.	Wagon No. 2	61	27	10	4.60	3.20	3.75	....
Storrer, A. W	Wagon No. 3	570	28	.....			......	....
Swanson, S. A	Wagon	270	296	18	4.80	3.00	3 54	....
Stellern, J. J	Store	387	340	11	4.00	3 00	3.45	....
Steinbeck, Mary	Wagon	......	.	1	4 00	4.00	4.00	....
Treadwell, T P	Wagon	360	284	13	4.00	3 00	3.38	....
Talbot, T. R	Wagon	206	285	12	6 00	3.00	3.77	....
Washington, A. L	Depot	231	390	10	4 70	3.00	3 58	....
Wilcox, D. C	Wagon	65	129	17	4.40	3.00	3.68	....
Woodcock, A. C	Wagon No. 1	29	132	12	4 20	3.00	3.74	....
Woodcock, A. C	Wagon No. 2	531	133	4	4.80	3 40	4.05	....
Welin, Christian	Wagon	523	......	6	4 60	3 00	3 66	....
Wendler, R C	Wagon	..	......	1	4.20	4 20	4 20	....
Young, E. D	Wagon	507	291	11	4.40	3 00	3 79	....
Total		......	....	556	4.40	3.20	3.75	....

MARSHALLTOWN.

NAME.	MANNER OF SELLING MILK.	Permit number for 1897.	Permit number for 1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
Bellus, S. E.	Wagon	145	136	43	5.50	3.00	4.07	....
Brown, C. W	Wagon	552	345	35	4.80	3.20	4.08	....
Cole, Alvin	Wagon	95	135	48	4.50	3.00	3.71	....
Downer, G. C	Wagon	579	....	27	6 10	3 20	3.98	....
Griffiths, H. C	Wagon	......	134	11	5.00	4.40	4.49	....
McCord, Dell	Wagon No. 1	353	......	26	4.20	3 00	3.66	....
McCord, Dell	Wagon No. 2	354	......	29	4.20	3.00	3.75	....
McCord, Dell	Depot	355	......	18	4.40	3.00	3.60	....
Plumb, J. M	Wagon	44	......	......	......	......	......	....
Roundy Bros	Wagon	211	....	41	5.00	3.30	3.96	....
Treffy, G.	Wagon	344	......	50	4.80	3.00	3.74	....
Varnum, C. B	Wagon No. 1	73	......	......	......	......	......	....
Varnum, C. B	Wagon No. 2	482	.....	49	4.40	3.00	3.67	....
Wilson, W. R.	Wagon	33	37	51	4.40	2.40	3.62	2
Winchell, E.	Wagon	......	......	12	4.80	3.60	4.22	....
Total		......	......	458	5.20	3.60	3.83	2

FORT MADISON.

NAME.	MANNER OF SELLING MILK.	Permit number for 1897.	Permit number for 1896.	Number of tests.	Highest test.	Lowest test.	Average test.	Number below standard.
Beelman, J. W	Wagon	50	141	23	5.00	3.20	3.97	
Burton, James	Wagon	42	140	31	5 40	3 50	4 54	...
Conradt, George	Wagon	41	..	34	4.60	3.20	3 89	....
Currier, T. C	Depot	358	350	9	5.20	3.20	4.26	....
		359	349	4	5.40	4.00	4.45	....
Drollinger, Frank	Wagon	......	144	24	4.40	3 20	3 82	....
Janse & Smith.	Wagon	540	348	25	4.60	2.80	3 91	1
Jones, L. G.	Wagon	......	351	30	6.00	3 20	4.57	....
Knapp & Holland	Wagon	38	138	29	7.60	3.40	4 40	....
Mansheim, John	Wagon	117	347	33	4 60	2.50	4.29	1
Mansheim, Mrs. B	Wagon	148	346	32	5.00	3.20	4 22	....
Skurk, F. E	Wagon	68	139	28	5.80	2 80	3.85	1
Stellern, J	Wagon	576	......	30	4.40	3.20	3.95	....
Smith, W. B	Wagon	146	142	8	5.20	3.90	4.75	....
Stewart, William	Wagon	....	136	6	5.00	4 00	4.20	....
Total		......	......	390	5.20	3.60	4.07	3

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BIENNIAL REPORT

OF THE

State Inspector of Oils.

1895-1897.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

DES MOINES:
F. R. CONAWAY, STATE PRINTER.
1898.

REPORT OF STATE INSPECTOR.

Hon. F. M. Drake, Governor of Iowa:

DEAR SIR—In accordance with the provisions of the statutes of Iowa, I have the honor to transmit herewith a report of the doings of myself and deputies for the biennial period ending June 30, 1897.

During the period covered by this report, little outside of a routine nature has occurred in the inspection service. There have been a few explosions of gasoline, due to the careless handling of it, but in no instance was the loss great.

The legislature did wisely two years ago in increasing the inspection fees on gasoline, making the fees for oil and gasoline uniform. Had not this been done the revenues derived by the state from the oil inspection service would have been much less than they have been. It is just as much work to brand a barrel of gasoline as it is to brand a barrel of oil, and no difference should ever have been made in the fees for the same.

I wish to say a brief word in commendation of the deputy oil inspectors, on whom the burden of the work of the service falls. They have been earnest and faithful in the discharge of every duty.

At the end of the biennial period covered by this report, inspectors were stationed as follows:

Luther A. Brewer	Cedar Rapids
R. M. Garrison	Cedar Rapids
Theo. Guittar	Council Bluffs
Jasper Giltner	Ottumwa
F. O. Udall	Dubuque
W. H. Goodrell	Iowa City
W. R. Wier	Davenport
Louis Weinstein	Burlington
H. M. Pickell	Des Moines

C. F. Gullixson	Bode
J. K. Mason	Keokuk
J. B. M. Bishop	Toledo
J. S. Bellamy	Knoxville
Peter Reily	Sioux City
F. N. Chase	Cedar Falls

Respectfully submitted,

LUTHER A. BREWER.

REPORTS OF INSPECTORS.

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF JULY, 1895.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No bbls oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	....	....	....	....	....	$ 39.81	$ 39.81
R. M. Garrison.....	Cedar Rapids	....	1,411	1,463	$ 214.25	$ 91.06	99 61	190.67
Theo. Guittar......	Council Bl'ffs	...	1,064	1.614	187.10	84.27	61 50	145.77
Jasper Giltner......	Ottumwa.....	....	650	729	101,45	62.86	38 41	101.27
F. O Udall..........	Dubuque......	....	2,001	948	247.50	99.38	183.93	283.31
W. H. Goodrell.....	Iowa City....	....	112	....	11.20	11.20	....	11.20
W. R. Weir....... ..	Davenport...	....	767	1,042	128.80	69.70	30.35	100.05
Louis Weinstein....	Burlington ..	....	1,648	1,015	215.55	91.39	44 95	136.34
H. M. Pickell.......	Des Moines..	....	1,315	2,469	254.95	100.00	120.75	220.75
C. F. Gullixson.....	Ft. Dodge....	....	828	1,015	133 55	70.88	52.63	123.51
J. K. Mason...	Keokuk.. .	....	161	639	48 05	48.05	26.05	74.10
G. D. Frink.........	Marshallt'n.	....	547	1,067	108 05	64.50	52 80	117.30
J. S. Bellamy	Knoxville....	....	223	314	38 00	38 00	15.68	53.68
W. C. Arthur.......	Sioux City....	....	1,118	1,705	197.05	86.76	84 34	171 10
F. N. Chase.........	Waterloo.....	....	958	1,107	151.15	75.49	33.47	108.96
Due Luther A. Brewer, state insp., on months of April May, June..		....	....	....	....	....	....	600.20
Due L. A. Brewer, state in., Aug. 1		....	....	....	441.87	....	....	....
Total..............		....	12,803	15,127	$2,478.02	$ 993.54	$ 884 28	$2,478.02

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF AUGUST, 1895.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer..	Cedar Rapids	....	.	....	....	....	$ 35.66	$ 35.66
R. M. Garrison.....	Cedar Rapids	...	1,642	1,191	$ 223.75	$ 98.44	$ 106.19	199 63
Theo. Guittar......	Council Bl'ffs	....	1,736	1,170	232 10	95.59	87.35	182.87
Jasper Giltner......	Ottumwa	...	1,024	627	133.75	70.94	43.16	114.10
F. O. Udall..........	Dubuque.....	....	2,210	1,471	294.55	100.00	189.14	289.14
W. H. Goodrell.....	Iowa City	....	111	223	22.25	22.25	....	22.25
W. R. Weir	Davenport...	....	861	1,046	138.40	72.10	36.10	108 20
Louis Weinstein...	Burlington ..	....	851	527	111 45	65.35	28 50	93.85
H. M. Pickell.......	Des Moines...	....	1,770	1,591	256 55	100.00	113.40	213.40
C. F. Gullixson.....	Ft. Dodge....	....	1,712	1,449	243.65	98.41	88.84	187.25
J. K. Mason.........	Keokuk.. ...	....	816	576	110.40	65.10	24.25	89 35
G. D. Frink.........	Marshallt'n..	....	1,557	1,752	243.30	98.30	48.15	146 45
J. S. Bellamy.	Knoxville....	....	394	304	54.60	51.15	17.18	68.33
W. C. Arthur.......	Sioux City....	....	1,265	1,422	197.60	86.90	86.96	173.86
F. N. Chase.........	Waterloo....	....	1,602	845	202.45	88.11	39.88	127.99
Due L. A. Brewer, state in., Aug. 1		....	....	....	....	....	....	441.37
Due L. A. Brewer, state in., Sept. 1		....	....	....	28 90	....	....	....
Total.........................		....	17,551	14,194	$2,493.70	$1,107.57	$ 944.76	$2,493 70

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF SEPTEMBER, 1895.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	..	....	....	....	....	$ 98.26	$ 98.26
R. M. Garrison.....	Cedar Rapids	342	1,088	600	$ 173.00	$ 80.75	102.14	182 89
Theo. Guittar......	Council Bl'ffs	....	2,770	1,299	341.95	100 00	105.20	205 20
Jasper Giltner.....	Ottumwa....	.	1,615	738	198.40	87.10	51.03	138.13
F. O. Udall.........	Dubuque.....	234	2,172	412	261.20	100 00	193.50	293.50
W. H. Goodrell.....	Iowa City....	....	88	111	13.85	13.85	....	13.85
W. R. Weir	Davenport...	....	1,662	....	166.20	79.05	41.10	120.15
Louis Weinstein...	Burlington..	...	1,290	333	145.65	73.90	34.25	108 15
H. M. Pickell.......	Des Moines..	...	2,955	1,423	366.65	100.00	108 95	208 95
C. F. Gullixson.....	Ft. Dodge ..	....	2,178	337	233.65	95 91	78.84	174.75
J. K. Mason	Keokuk......	...	1,561	427	177 45	81 86	32.58	114.39
G. D. Frink.........	Marshallt'n..	....	2,572	142	264 30	100 00	52.95	152.95
J. S. Bellamy.	Knoxville....	111	594	479	94.45	61 11	27.36	88.47
W. C. Arthur.......	Sioux City....	...	1,854	1,715	271.15	100 00	98 57	198 57
F. N. Chase........	Waterloo ...	....	392	915	84.95	58.74	27.09	85.83
Due L. A. Brewer, state in., Sept. 1		....	....	....	....	....	....	28.90
State treasurer....................		....	....	....	....	....	....	579.91
Total....................		687	22,781	8,921	$2,792.85	$1,132.27	$1,051.77	$2,792 85

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF OCTOBER, 1895.

INSPECTOR.	STATION.	No. bbls oil rejected.	No bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	....	....	....	....	....	$ 31.25	$ 31.25
R. M. Garrison.....	Cedar Rapids	299	1,305	112	$ 166 00	$ 79.00	111.41	190 41
Theo. Guittar......	Council Bl'ffs	....	2,205	1,018	271.40	100.00	96 05	196.05
Jasper Giltner....	Ottumwa	675	1,534	670	254.40	100.00	82.37	182.37
F. O. Udall.........	Dubuque.....	....	2,574	582	286 50	100.00	176.81	276 81
W. H. Goodrell.....	Iowa City....	...	321	....	32.10	32.10	....	32.10
W. R. Weir.........	Davenport...	...	1,407	526	167.00	79 25	64 90	144 15
Louis Weinstein...	Burlington..		1,701	561	198.15	87.04	52.35	139.39
H. M. Pickell.......	Des Moines..	83	1,617	1,898	264.90	100.00	128.40	228 40
C. F. Gullixson.....	Ft. Dodge....	....	1,701	699	205.05	88.76	87.70	176.46
J. K. Mason	Keokuk......	5	689	414	90.10	60.02	28.70	88.72
G. D. Frink.........	Marshallt'n..	...	1,984	1,170	256.90	100.00	85 00	185 00
J. S. Bellamy.......	Knoxville....	110	763	200	97 30	61.82	28.68	90 50
W. C. Arthur.......	Sioux City...	....	2,041	1,276	267 90	100.00	129.83	229.83
F. N. Chase.........	Waterloo.....	....	972	737	134.05	71.01	51.64	122.65
State treasurer....	....	....	....	....	......	....	....	377.66
Total........	....	1172	20,814	9,863	$2,691·75	$1,159.00	$1,155.09	$2,691.75

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF NOVEMBER, 1895.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	....	....	....	....	....	$ 32.35	$ 32.35
R. M. Garrison.....	Cedar Rapids	....	2,279	144	$ 285.10	$ 96.27	129.10	225 87
Theo. Guittar......	Council Bl'ffs	....	3,065	226	317.80	100.00	113.55	218.55
Jasper Giltner......	Ottumwa	....	1,577	....	157.70	76.92	52.93	129.85
F. O. Udall.........	Dubuque.....	....	3,756	356	388.40	100.00	184.25	284.25
W. H. Goodrell.....	Iowa City....	....	70	83	11.15	11 15	....	11.15
W. R. Weir.........	Davenport...	....	2,797	267	293 05	100.00	77.60	177.60
Louis Weinstein...	Burlington...	....	1,981	....	198.10	87.00	41.90	128.90
H. M. Pickell.......	Des Moines..	67	4,063	144	422.20	100 00	117.85	217.85
C. F. Gullixson.....	Ft. Dodge. .	6	1,884	306	204 80	88.57	92.35	180 92
J. K Mason	Keokuk	....	2,002	306	215.50	91.38	38.85	130.23
G. D. Frink.........	Marshallt'n..	...	1,682	....	168.20	79.50	70.00	150.50
J. S. Bellamy.......	Knoxville....	143	865	111	106 35	64.09	24.18	88 27
W. C. Arthur......	Sioux City...	...	2,239	563	252.05	100.00	105.22	205 22
F. N. Chase.........	Waterloo	.. .	1,838	111	189.35	84.84	36.75	121.59
State treasurer....	....	....	....	....	....	... .	....	859.65
Total..........	....	216	30,098	2,517	$3,157.25	$1,179 72	$1,117.88	$3,157.25

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF DECEMBER, 1895.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	....	....	....	....	.....	$ 48.35	$ 48.35
R. M. Garrison.....	Cedar Rapids	....	2,105	566	$ 238.80	$ 97.20	124 94	222.14
Theo. Guittar......	Council Bl'ffs	...	2,661	80	267.60	100.00	113.45	213 45
Jasper Giltner.....	Ottumwa	....	2,663	....	266.30	100.00	75.82	175 82
F. O. Udall	Dubuque	....	4,761	8	476.50	100.00	198.20	298.20
W. H. Goodrell.....	Iowa City....	...	221	....	22.10	22 10	....	22 10
W. R. Weir.........	Davenport ..	....	2,090	211	219 55	92.39	105 55	197.94
Louis Weinstein ...	Burlington ..	....	1,254	....	125.40	68.85	30.75	99.60
H. M. Pickell	Des Moines..	....	3,995	403	419.65	100 00	117.55	217.55
C. F. Gullixson.....	Ft. Dodge....	....	2,727	347	290 05	100.00	107.08	207.08
J. K. Mason.........	Keokuk	10	1,062	117	112.05	65 50	38.80	104.30
G. D. Frink.........	Marshallt'n..	...	1,423	111	147.85	74.45	76.80	151 25
J. S. Bellamy.......	Knoxville....	....	658	....	65.80	53 95	24 18	78.13
W. C. Arthur.......	Sioux City....	....	2,713	348	288.70	100.00	175 88	275 88
F. N. Chase.........	Waterloo	. ..	2,000	375	218.75	92.20	51.05	143.25
State treasurer....	....	....	....	....	......	....	....	704.06
Total..........	....	10	30,383	2,516	$3,159.10	$1,166.64	$1,288 40	$3,159.10

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF JANUARY, 1896.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer	Cedar Rapids	....	....	....	.....	... .	$ 39 54	$ 39 54
R. M. Garrison	Cedar Rapids	..	2,350	70	$ 238.50	$ 97.12	118 35	215 47
Theo. Guittar	Council Bl'ffs	.	2,612	303	276.35	100.00	109.45	209.45
Jasper Giltner	Ottumwa	....	1.832	111	188.75	84 68	85 20	169.88
F. O. Udall	Dubuque	...	2,942	296	309 00	100.00	177.60	277.60
W. H. Goodrell	Iowa City	....	193	....	19.30	19.30	....	19.30
W. R. Weir	Davenport	....	1,771	280	191.10	85 25	89 70	174.95
Louis Weinstein	Burlington	..	1,187	.....	118 70	67.18	30 95	98 13
H. M. Pickell	Des Moines	225	3,072	804	369 90	100.00	122.45	222 45
C. F. Gullixson	Fort Dodge	...	1,867	258	199.60	87.40	85.26	172.66
J. K. Mason	Keokuk	2	1,190	128	125.60	68 90	42.15	111.05
G. D. Frink	Marshallt'n	....	2,445	111	250.05	100 00	86.90	186.90
J. S. Bellamy	Knoxville	..	834	....	83.40	58.35	30.36	88.71
W. C. Arthur	Sioux City	..	2,[illegible]24	427	303.75	100 00	120.98	220 98
F. N. Chase	Waterloo	6	1,871	356	205.50	88 88	63.00	151.88
State treasurer	....	....	....	.....	... .	....	....	520.55
Total	... ...	233	26,090	3,144	$2,879 50	$1,157.06	$1,201.89	$2,879 50

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF FEBRUARY, 1896.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer	Cedar Rapids	...	.. ..	....	....	....	$ 93.56	$ 93 56
R. M. Garrison	Cedar Rapids	1	2,459	71	$ 249.55	$ 99.88	121.73	221 61
Theo. Guittar	Council Bl'ffs	..	2,984	227	309.75	100 00	115 25	215 25
Jasper Giltner	Ottumwa	....	1,052	111	111.75	65.44	50.23	115.67
F. O. Udall	Dubuque	....	3,582	270	371.70	100 00	196 15	296 15
W. H. Goodrell	Iowa City	..	221	.....	22 10	22 10	... ...	22 10
W. R. Weir	Davenport	....	1,740	114	179.70	82.43	91.74	174.17
Louis Weinstein	Burlington	....	1,662	....	166 20	79.05	38.40	117 45
H. M. Pickell	Des Moines	....	3,487	465	371 95	100 00	196.15	296 15
C. F. Gullixson	Fort Dodge	....	1,870	364	205.20	88 80	82 01	170.81
J. K. Mason	Keokuk	....	947	80	98 70	62.18	33.35	95.53
G. D. Frink	Marshallt'n	...	1,811	227	192.45	85 61	83 30	168.91
J. S. Bellamy	Knoxville	118	813	144	100.80	62 58	21.50	84.08
W. C. Arthur	Sioux City	1	1,958	518	231.80	92 95	123 34	216.29
F. N. Chase	Waterloo	..	2,026	15	203.85	88.84	56.74	145 08
State treasurer	....	...	..	.. ..	....	....	....	461 59
Total	....	120	26,622	2,606	$2,801 50	$1,129.36	$1,213.55	$2,804 50

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF MARCH, 1896.

INSPECTOR.	STATION.	No. bbls. oil rejected	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	....	....	....	.....	......	$ 210.70	$ 210.70
R. M. Garrison.....	Cedar Rapids	8	1,553	674	$ 189 30	$ 84.82	110.66	195.48
Theo. Guittar	Council Bl'ffs	....	1,326	281	146 65	74.16	74 90	149 06
Jasper Giltner.....	Ottumwa.....	....	609	196	70.70	55.17	44.07	99.24
F. O. Udall	Dubuque.....	....	2,783	88	282 70	100 00	181.80	281.80
W. H. Goodrell.....	Iowa City ...	..	241	121	30.15	30 15	12 70	42 85
W. R Weir..........	Davenport...	....	754	338	92.30	60.58	51.10	111.68
Louis Weinstein...	Burlington...	...	547	229	66.15	54.04	15 90	69.94
H. M. Pickell.......	Des Moines..	120	1,489	1,505	236.15	96.53	112.20	208.73
C. F. Gullixson....	Ft. Dodge....	..	832	268	96.60	61.65	63.99	125 64
J. K. Mason........	Keokuk... ...	...	471	40	49 10	49 10	45.50	94.60
G. D Frink.	Marshallt'n..	....	990	306	114.30	66 08	60 95	127 03
J. S. Bellamy.......	Knoxville ...	....	650	82	69.10	54 77	22.18	76.95
W. C. Arthur.......	Sioux City....	...	1,494	672	183.00	83 25	244.32	327.57
F. N Chase.........	Waterloo.....	....	593	979	103 25	64 56	40 28	104 84
Due L. A. Brewer, state in.........		....	......	....	491 66	....	....	....
Total..........		128	14,332	5,779	$2,226 11	$ 934 86	$1,291.25	$2,226 11

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF APRIL, 1896.

INSPECTOR.	STATION.	No bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	....	. .	..	....	.... ..	$ 129.65	$ 129 65
R. M. Garrison	Cedar Rapids	....	466	548	$ 101.40	$ 62 85	117.17	180.02
Theo. Guittar	Council Bl'ffs	....	950	674	137.70	71 92	107.60	179 52
Jasper Giltner......	Ottumwa....	...	640	303	84 60	58.65	33 33	91 98
F. O. Udall..........	Dubuque.....	....	856	644	153 75	70 94	162.80	233.70
W. H. Goodrell.....	Iowa City....	. ..	83	83	16.60	16.60	22.65	39.25
W. R. Weir..... ...	Davenport...	...	384	570	74.70	56 17	43 45	99.62
Louis Weinstein...	Burlington ..	...	581	195	73 45	55.86	18 80	74 66
H. M. Pickell.......	Des Moines..	....	1.399	863	208.95	89 75	113.30	203 05
C. F. Gullixson.....	Ft. Dodge....	....	782	610	108.70	64.67	66 25	130 92
J. K. Mason.........	Keokuk.......	...	419	454	72 10	55 52	41 54	97.06
J. R. M Bishop	Marshallt'n .	...	575	249	74.10	56 03	114 90	170 93
J. S. Bellamy.......	Knoxville....	....	354	222	52.05	50.51	24.68	75.19
Peter Reilly.........	Sioux City...	....	1,325	991	196.30	86 57	165.29	251.86
F. N. Chase.........	Waterloo. ...	..	521	580	94.05	61 01	43.58	104.59
Due L A. Brewer, state in.........		....	....	....	685.59	....	... .	....
Total.........................			9,285	6,936	$2,064 04	$ 857.05	$1,206.99	$2,064 04

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF MAY, 1896.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	...	....	.....	....	....	$ 54.83	$ 54.83
R. M. Garrison....	Cedar Rapids	1	700	679	$ 188 00	$ 72.00	116 61	188.61
Theo. Guittar	Council Bl'ffs	....	1,252	1,543	279.50	100 00	77 70	177.70
Jasper Giltner.....	Ottumwa	....	608	449	105.20	63.80	24 39	88.19
F. O Udall.........	Dubuque.....	....	914	1,447	286.10	96 53	179.25	275 78
W. H. Goodrell.....	Iowa City	....	192	225	41.70	41.70	21 77	63 47
W. R. Weir.........	Davenport ..	....	751	484	123.50	68.38	55 25	123.63
Louis Weinstein...	Burlington ..	....	293	597	89.00	59 75	22 50	82.25
H. M. Pickell.......	Des Moines..	....	1,092	1,983	307.40	100 00	110 15	210.15
C. F. Gullixson.....	Ft. Dodge..	...	448	1.213	166 10	79.02	61 46	140.48
J. K. Mason	Keokuk.......	....	687	607	129 40	69.85	39 83	109 68
J. B. M. Bishop.. ..	Marshallt'n.	..	895	1,164	205 90	88 98	98.12	187 10
J. S. Bellamy.......	Knoxville....	....	511	278	78 90	57.23	32 54	89 76
Peter Reilly.........	Sioux City...	..	902	1.171	207.30	89 32	67.64	156.96
F. N. Chase.........	Waterloo	....	630	1,258	188.80	84.70	54.75	139.45
Due L. A. Brewer, state in., May 1		..	....	....	....	....	....	635.59
Due L. A. Brewer, state in., June 1		....	....	....	426.83	....	......	... .
Total.....		1	13,096	9,872	$2,723 63	$1,071.25	$1,016.79	$2.723.63

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF JUNE, 1896.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	....	....	....	....	....	$ 118 91	$ 118.91
R. M. Garrison.....	Cedar Rapids	....	1,014	1,491	$ 250 50	$ 100.00	117.75	217.75
Theo Guittar	Council Bl'ffs	...	1,427	1,249	267.60	100.00	99 35	199 35
Jasper Giltner.....	Ottumwa	...	1,200	1,296	249.60	99.90	54 13	154.03
F. O. Udall	Dubuque.....	....	1,487	1.060	254.70	100.00	188 95	288 95
W. H. Goodrell....	Iowa City....	....	443	270	71.30	55.32	34 10	89.42
W. R. Weir.........	Davenport...	....	721	433	115.40	66.35	40 70	107.05
Louis Weinstein...	Burlington ..	...	817	313	118.00	65 75	24 90	90 65
H. M. Pickell......	Des Moines..	....	1,886	1,237	312.30	100.00	108.30	208 30
C. F. Gullixson.....	Ft. Dodge....	....	1,569	1,320	288.90	100 00	84.75	184 75
J. K. Mason	Keokuk.......	....	1,248	826	207.40	89 35	43.85	133.20
J. B. M. Bishop.....	Marshallt'n..	....	1,434	1,058	249 20	99.80	102.86	202 66
J. S. Bellamy.......	Knoxville ...	....	394	343	73.70	55.92	19.58	75 50
Peter Reilly.........	Sioux City ...	...	1,303	1,335	263.80	100 00	96 64	196.64
F. N. Chase.........	Waterloo	....	1,018	1,102	212.00	90.50	52 23	142.73
Due Luther A. Brewer, state inspector, April and May.........		....	....	....	....	....	....	426 83
State treasurer....................		....	....	....	....	....	....	92 68
Total......	....	....	15.961	18,333	$2,929 40	$1.222.89	$1,187.00	$2,929.40

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF JULY, 1896.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer..	Cedar Rapids	....	....	....	....	....	$ 86 69	$ 86.69
R. M. Garrison......	Cedar Rapids	4	1,568	940	$ 251.20	$ 100 00	125.16	225.16
Theo. Guittar.	Council Bl'ffs	....	2,141	1,378	351 90	100 00	109 60	209.60
Jasper Giltner......	Ottumwa	...	731	653	138.30	72 07	29.12	101.19
F. O. Udall.	Dubuque....	....	1,929	771	270.00	100.00	164 60	264 60
W. H Goodrell.....	Iowa City....	....	609	418	102.70	63.17	43.95	107.12
W. R. Weir.........	Davenport...	....	1,078	695	170.30	80.08	51.20	131 28
Louis Weinstein...	Burlington ..	....	594	277	87.10	59 27	21.90	81.17
H. M. Pickell.	Des Moines...	....	1,277	2,065	334.20	100 00	117.30	217.30
C. F. Gullixson.....	Ft Dodge....	....	1,020	864	188.40	84.60	61.06	145 66
J. K. Mason.........	Keokuk	...	164	924	108 80	64.70	35 35	100 05
J. B. M. Bishop....	Marshallt'n..	....	344	892	123 60	68 40	82.06	150 46
J. S. Bellamy. ...	Knoxville....	....	366	362	72.80	55 70	25 68	81.38
Peter Reily.........	Sioux City....	1	1,056	1,305	236.20	96.55	96.62	193.17
F. N. Chase.........	Waterloo.....	....	707	1,072	177.90	81 97	34.40	116 37
State treasurer.....	....	....	.. ..	....	....	....	... .	402 20
Total ...	....	5	13,548	12,545	$2,613 40	$1,128.51	$1,084.69	$2,613.40

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF AUGUST, 1896.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved	No. bbls gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer..	Cedar Rapids	....	....	....	....	....	$ 57 33	$ 57.33
R. M. Garrison.....	Cedar Rapids	....	365	792	$ 115 70	$ 66.43	108 83	175 25
Theo. Guittar	Council Bl'ffs	....	1,454	1,387	284.10	100.00	85.75	185 75
Jasper Giltner.....	Ottumwa......	....	1,255	671	192 60	85.65	70.70	156 35
F. O. Udall.........	Dubuque	...	1,068	1,464	253.20	100.00	145.30	245 30
W. H. Goodrell.....	Iowa City.....	....	249	248	49.70	49.70	19.45	69.15
W. R. Weir	Davenport...	....	253	332	58.50	52.18	40 50	92.68
Louis Weinstein...	Burlington...	....	579	276	85.50	58 87	23 85	82.72
H. M. Pickell.......	Des Moines...	....	829	2,165	299.40	100 00	117.45	217.45
C. F. Gullixson.....	Ft. Dodge.....	....	730	1,122	185.20	83 80	68.71	152 51
J. K. Mason.........	Keokuk.......	..	350	582	98.20	60.80	53 35	114 15
J. B. M Bishop....	Marshallt'n..	...	797	732	152.90	75.72	90.18	165.90
J. S. Bellamy.......	Knoxville....	...	296	298	59 40	52.35	21.68	74.03
Peter Reily	Sioux City...	....	749	1,324	207.30	89 33	88.05	177.38
F. N. Chase.........	Waterloo	....	492	818	131.00	70.25	45.31	115.56
State treasurer.....	....	....	.... ..	....	... .	....	....	86.24
Total..	....	....	9,466	12,211	$2,167.70	$1,045 02	$1,036.44	$2,167.70

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF SEPTEMBER, 1896.

INSPECTOR.	STATION.	No. bbls. oil rejected	No. bbls. oil approved.	No bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A Brewer	Cedar Rapids	....	....	....	....	....	$ 30.71	$ 30.71
R. M. Garrison	Cedar Rapids	...	962	872	$ 183.40	$ 83.35	113.48	196.83
Theo. Guittar	Council Bl'ffs	....	1,052	1,035	208.70	89 67	91.05	180 72
Jasper Giltner	Ottumwa	....	1,337	646	198 30	87 07	42.19	129 26
F O Udall	Dubuque	112	2,127	674	291.30	100.00	188 85	288.35
W. H. Goodrell	Iowa City	..	610	187	79.70	57 42	39.90	97 32
W. R. Weir	Davenport	...	952	250	120 20	67 80	35 60	103.40
Louis Weinstein	Burlington	..	110	215	32.50	32.50	8 90	41.40
H. M. Pickell	Des Moines	....	2,015	736	275.10	100.00	114.80	214 80
C. F. Gullixson	Ft. Dodge	....	1,614	676	229.00	94 75	83.71	178 46
J. K. Mason	Keokuk	...	1,253	326	157.90	76 98	39.30	116.28
J. B. M. Bishop	Marshallt'n	....	930	419	139 90	72.48	109 94	182 42
J. S. Bellamy	Knoxville	..	523	177	70.00	55 00	31.33	86.33
Peter Reilly	Sioux City	....	1,586	1,178	276 40	100.00	120 50	220 50
F. N. Chase	Waterloo	...	710	780	149 00	74.75	47.95	122.70
State treasurer	....	..	....	....	.....	....	....	221.92
Total	....	112	15,831	8,171	$2,411.40	$1,091.77	$1,097.71	$2,411.40

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF OCTOBER, 1896.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer	Cedar Rapids	....	.....	....	.....	....	$ 31.65	$ 31.65
R. M. Garrison	Cedar Rapids	....	3,239	276	$ 331.50	$ 100 00	134 28	234.28
Theo. Guittar	Council Bl'ffs	....	3,877	672	454.90	100.00	169 20	269.20
Jasper Giltner	Ottumwa	....	1,680	581	226.10	94 02	71 07	165 09
F. O. Udall	Dubuque	....	2,768	325	309 50	100.00	188.70	288.70
W. H. Goodrell	Iowa City	....	967	316	128 30	69.57	39 80	109.37
W. R. Weir	Davenport	..	1,467	228	169.50	79.87	48 70	128 57
Louis Weinstein	Burlington	....	2,290	28	231.80	95.45	54 15	149 60
H M. Pickell	Des Moines	.. ..	3,277	877	416 40	100.00	136.55	236 55
C. F. Gullixson	Ft. Dodge	...	2,901	552	345.30	100.00	126.20	226.20
J. K. Mason	Keokuk	111	1,392	148	165.10	78 78	42 85	121.63
J. B. M. Bishop	Marshallt'n	....	2,931	399	333 00	100.00	123 06	223 06
J. S. Bellamy	Knoxville	....	1,354	83	143.70	73.43	30 36	103.79
Peter Reilly	Sioux City	...	2,825	954	377.90	100.00	160.74	260.74
F. N. Chase	Waterloo	....	1,961	589	255 00	100.00	53.84	153 84
State treasurer	....	....	....	....	....	......	....	1,204.53
Total	....	111	32,929	6,028	$3,906 80	$1,291.12	$1,411 15	$3 906.80

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF NOVEMBER, 1896.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	....	. .	.....	....	....	$ 40.93	$ 40 93
R. M. Garrison.....	Cedar Rapids	.. .	2,028	296	$ 232 40	$ 95.60	137.75	233.35
Theo. Guittar......	Council Bl'ffs	....	3 564	159	372.30	100.00	154.95	254.95
Jasper Giltner.....	Ottumwa	. ..	2,964	113	307.70	100 00	87.88	187.88
F. O. Udall...	Dubuque.....	....	4,118	362	448.00	100 00	202.95	302.95
W. H. Goodrell.....	Iowa City....	.	1,277	83	136.00	71.50	58.00	129.50
W. R. Weir	Davenport...	....	1,339	186	152.50	75.63	51.65	127.28
Louis Weinstein...	Burlington ..	...	372	85	45 70	45 70	12 40	58.10
H. M. Pickell..	Des Moines .	....	3,401	315	371 60	100.00	119.15	219 15
C. F. Gullixson.....	Fort Dodge..	....	2,236	213	244 90	98.72	114 18	212.90
J. K. Mason...	Keokuk......	10	1.410	528	194 80	86 20	50 15	136.35
J. B. M. Bishop.....	Marshallt'n..	....	1,890	201	209.10	89.78	109.16	198 94
J. S. Bellamy......	Knoxville....	....	770	166	93.60	60.90	34 04	94 94
Peter Reilly.........	Sioux City...	...	3,179	569	374 80	100.00	150 17	250.17
F N. Chase.........	Waterloo.....	....	2,016	277	229.30	94.82	66.58	161.40
State treasurer	....	....	....	.... .	....	....	....	803.91
Total	... .	10	30,564	3,553	$3,412 70	$1.218.85	$1,389.94	$3,412.70

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF DECEMBER, 1896.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	....	..	....	....	....	$ 33.81	$ 33.81
R. M. Garrison....	Cedar Rapids	25	1,733	92	$ 185 00	$ 83.75	133 42	217 17
Theo. Guittar......	Council Bl'ffs	6	3,316	514	373 60	100.00	142.00	242 00
Jasper Giltner....	Ottumwa	33	2.022	349	240.40	97.60	81.76	179.36
F. O. Udall	Dubuque.....	....	4,015	495	451.00	100 00	206 65	306.65
W. H. Goodrell. . .	Iowa City....	....	907	108	101.00	62.75	47.70	110.45
W. R. Weir	Davenport...	...	1,370	205	157.50	76.87	50.45	127.32
Louis Weinstein...	Burlington ..	....	537	115	65 20	53.80	20.20	74 00
H. M. Pickell.......	Des Moines ..	111	3,496	364	397.10	100.00	125.15	225 15
C. F Gullixson....	Fort Dodge..	16	2,177	368	256.10	100.00	116.93	216.93
J. K. Mason	Keokuk	....	1.284	135	141.90	72.98	60.67	133.65
J. B. M Bishop.....	Marshallt'n..	....	2,045	386	243.10	98.27	130.12	228 39
J. S Bellamy.......	Knoxville....	...	1,186	200	138 60	72.15	36 54	108 69
Peter Reilly....... .	Sioux City...	....	2,830	576	339.60	100 00	149 80	249 80
F. N Chase.	Waterloo.....	....	1,604	334	243 80	98.45	66.65	165 10
State treasurer	....	....	....	... .	....	....	....	715.43
Total	....	191	28,412	4,736	$3.333.90	$1,216 62	$1,401.85	$3.333 90

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF JANUARY, 1897.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	....	....	....	......	......	$ 17.97	$ 17.97
R. M. Garrison.....	Cedar Rapids	1	2,238	538	$ 277 70	$ 100.00	109 16	209 16
Theo. Guittar......	Council Bl'ffs	....	2,597	156	275 30	100 00	160.15	260 15
Jasper Giltner.....	Ottumwa.....	....	1,699	147	184.60	83 65	69 18	152 83
F. O. Udall..	Dubuque....	...	3,811	28	383 90	100.00	212 85	312.85
W. H. Goodrell....	Iowa City....	....	1,387	3	139.00	72.25	60 53	132 78
W. R. Weir.........	Davenport...	....	1,485	311	179.60	82.40	67 45	149.85
Louis Wenstein....	Burlington ..	....	971	2	97 30	61.82	24 55	86.37
H. M. Pickell.......	Des Moines..	....	3,005	535	354.00	100 00	121.40	221.40
O. F. Gullixson.....	Ft. Dodge....	1	2,155	407	253.30	100 00	112 29	212 29
J. K. Mason...... ..	Keokuk ...	....	1,480	167	164 70	78 68	35.41	114.09
J. B. M. Bishop.....	Marshallt'n..	...	1,977	276	225.30	93 82	103 06	196 88
J. S. Bellamy.......	Knoxville....	....	920	....	92.00	60.50	39.96	100 46
Peter Reily.........	Sioux City...	....	3,332	585	391.70	100.00	167.00	267.00
F. N. Chase.	Waterloo.....	...	2,181	271	245 20	98.80	65 36	164 16
State treasurer...	... .	....	....	....	....	....	....	668 36
Total	....	2	29,238	3,426	$3,266 60	$1,231 92	$1,366 32	$3,266 60

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF FEBRUARY, 1897.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	....	....	.....	......	....	$ 59.48	$ 59 48
R. M. Garrison.....	Cedar Rapids	....	1,797	307	$ 210.40	$ 90.10	102.31	192.41
Theo. Guittar	Council Bl'ffs	...	1,964	310	227 40	94 35	112 45	206 80
Jasper Giltner......	Ottumwa....	20	1,748	83	185 10	83.78	71.23	155 01
F. O. Udall..........	Dubuque.....	....	3,653	257	391 00	100.00	196 55	296.55
W. H. Goodrell.....	Iowa City....	....	1,091	111	120.20	67 55	45 12	112.67
W. R. Weir.........	Davenport...	....	1,007	79	108 60	62.15	40.00	102.15
Louis Weinstein...	Burlington ..	....	938	171	110 90	65.22	29 00	94.22
H. M. Pickell.......	Des Moines..	....	2,396	644	304.00	100 00	124 40	224 40
O. F Gullixson.....	Ft. Dodge ...	1	1,278	426	170 50	80.12	89 56	169.68
J. K. Mason........	Keokuk.......	....	995	317	131.20	70.30	35.70	106.00
J. B. M. Bishop.....	Marshallt'n..	..	1,535	192	172 70	80.68	112.01	192.69
J. S. Bellamy.......	Knoxville....	....	848	....	84 80	58.68	27 11	85.79
Peter Reily...... ..	Sioux City...	....	1,813	904	271.70	100 00	139.79	239.79
F. N. Chase...	Waterloo	....	1,413	123	153.60	75 90	65 38	141.28
State treasurer....	....	...	....	.....	.. .	....	....	263.18
Total..........	....	21	22,476	3,924	$2,642.10	$1,128 83	$1,250.09	$2,642.10

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF MARCH, 1897.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	...	....	....	....	... .	$ 121.37	$ 121.37
R. M. Garrison.....	Cedar Rapids	1	1,262	281	$ 154.40	$ 76 10	89.60	165.70
Theo. Guittar	Council Bl'ffs	....	3,306	712	401.80	100.00	127 40	227 40
Jasper Giltner.....	Ottumwa	....	1,430	423	185.30	83.82	54.79	138.61
F. O. Udall	Dubuque	...	2,474	317	279.10	100.00	166.30	266.30
W. H. Goodrell.....	Iowa City ...	...	773	173	94 60	61.65	34 95	96.10
W. R. Weir	Davenport...	....	723	199	92 20	60.55	28 25	88.80
Louis Weinstein ...	Burlington ..	....	1,129	255	138.40	72.10	32.90	105.00
H. M. Pickell......	Des Moines..	....	2,708	370	307.80	100 00	112.70	212.70
C. F. Guilixson.....	Ft. Dodge....	...	1,500	441	194.10	86.02	96.84	182.86
J. K. Mason	Keokuk	...	1,682	259	194.10	86.03	45.30	131 33
J. B M. Bishop....	Marshallt'n..	....	1,913	368	228 10	94 53	117.34	211.87
J. S. Bellamy.......	Knoxville....	....	627	194	81.10	58 03	20.68	78 71
Peter Reilly.........	Sioux City...	....	2,470	482	295 20	100.00	168.80	268.80
F. N. Chase.........	Waterloo.....	....	1,190	767	195.70	86.42	47.04	133 46
State treasurer	....		....	....	....	....	....	418.89
Total.........	....	1	23,187	5,241	$2,842 90	$1,164.75	$1,264.26	$2,842.90

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF APRIL, 1897.

INSPECTOR.	STATION.	No. bbls. oil rejected	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer.	Cedar Rapids	....	.... ..	.....	.. ..	....	$ 17 80	$ 17.80
R. M. Garrison.....	Cedar Rapids	....	1,263	335	$ 159.80	$ 77.45	78 19	155 64
Theo. Guittar......	Council Bl'ffs	....	1,355	706	206 10	89 02	85.65	174.87
Jasper Giltner.....	Ottumwa	....	516	429	94.50	61.12	41 31	102.43
F. O. Udall	Dubuque.....	....	1,622	922	244 40	98.60	164.75	263 35
W. H. Goodrell.....	Iowa City....	....	665	20	68.50	54.62	31 30	85.92
W. R. Weir	Davenport...	....	741	178	91.90	60 47	28.75	89.22
Louis Weinstein ...	Burlington ..	....	533	244	77.70	56.92	17.90	74 82
H. M. Pickell.......	Des Moines..	110	1,398	2,023	353.10	100 00	127.30	227.30
C. F. Gullixson.....	Ft. Dodge....	1	1,337	891	222.90	93.22	94 88	188.10
J. K. Mason	Keokuk.......	45	413	159	61.70	52 93	31.10	84 03
J. B. M. Bishop.....	Marshallt'n..	....	1,101	785	188.60	84 65	108.54	193.19
J. S. Bellamy.......	Knoxville....	....	319	256	57.50	51 88	14.00	65.88
Peter Reilly.........	Sioux City...	2	1,307	1,174	248.30	99.58	144.80	244.38
F. N. Chase.........	Waterloo	....	1,210	316	152.60	75.65	52.83	128.48
State treasurer....	....	....	..	....	....	....	....	132.39
Total.	....	158	13,780	8,338	$2,227.60	$1,056.11	$1,039.10	$2,227.60

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF MAY, 1897.

INSPECTOR.	STATION.	No bbls oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer..	Cedar Rapids	..	....	....	....	....	$ 16 90	$ 16 90
R. M. Garrison....	Cedar Rapids	..	1,080	1,042	$ 212.20	$ 90.55	87 68	178.23
Theo. Guittar......	Council Bl'ffs	...	2,128	1 659	378.70	100.00	123 45	223 45
Jasper Giltner......	Ottumwa	....	943	535	147.80	74 45	52 88	127.33
F. O. Udall	Dubuque.....	..	1,643	785	242.80	98.20	167.15	265 35
W. H. Goodrell.....	Iowa City....	....	633	391	102 40	63.10	31.80	94 90
W. R. Weir	Davenport...	..	599	721	132.00	70 50	48.70	119.20
Louis Weinstein...	Burlington...	....	241	112	35.30	35.30	10 40	45.70
H. M. Pickell.	Des Moines..	....	1,445	1,094	253 90	100.00	119 45	219 45
C. F. Guilixson.....	Ft. Dodge....	....	1,013	1,228	224.10	93 52	71 93	165.45
J. K. Mason.	Keokuk.......	...	926	593	151.90	75.48	37.10	112.58
J. B. M. Bishop....	Marshallt'n..	....	640	417	105 70	63.93	85 19	149.12
J. S. Bellamy.......	Knoxville....	..	333	255	58.80	52 20	13.50	65.70
Peter Reily.........	Sioux City...	4	1,480	1,501	298 50	100 00	157.17	257.17
F. N. Chase.........	Waterloo	....	1,038	1,109	214.70	91.18	50 76	141 94
State treasurer....	....	...	....	....	....	....	....	376.33
Total..	....	4	14,142	11,442	$2,558.80	$1,108.41	$1,074 06	$2,558.80

REPORT OF INSPECTIONS, SALARY AND EXPENSE FOR THE MONTH OF JUNE, 1897.

INSPECTOR.	STATION.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.	Amount of fees retained.	Expense.	Total expense.
Luther A. Brewer..	Cedar Rapids	....	....	.. .. ..	....	....	$ 30.26	$ 30 26
R. M. Garrison......	Cedar Rapids	....	774	1,152	$ 192.60	$ 85 65	77 59	163 24
Theo. Guittar......	Council Bl'ffs	....	816	1,312	212.80	90.70	79.30	170 00
Jasper Giltner.....	Ottumwa	....	1,051	838	188 80	84.57	78.98	163 55
F. O. Udall	Dubuque.....	...	1,314	866	218 00	92.00	144.95	236.95
W. H. Goodrell.....	Iowa City....	..	858	451	80 90	57.73	19.71	77.44
W. R. Weir..	Davenport...	..	762	414	117 60	66.90	40.50	107.40
Louis Weinstein...	Burlington ..	....	501	379	88.00	59.50	22.40	81.90
H. M. Pickell.	Des Moines..	....	928	1,577	250 50	100.00	110 50	210.50
C. F. Gullixson.....	Ft. Dodge ..	....	243	512	75.50	56 37	51.35	107.72
J. K. Mason	Keokuk	....	278	496	77.40	56 85	31.75	88 60
J. B. M. Bishop.....	Marshallt'n..	....	426	829	126.50	68.88	85.19	154 07
J. S. Bellamy......	Knoxville ...	.	278	233	50 10	50.02	24.36	74.38
Peter Reily.........	Sioux City....	..	1,823	1,248	257.10	100.00	134 05	234.05
F. N. Chase........	Waterloo	..	305	209	111.40	65.35	32.84	98 19
State treasurer....	....	...	......	....	....	....	....	47 45
Total.	....	...	9,857	11,100	$2,045 70	$1,034 52	$ 963 73	$2,045.70

CONSOLIDATION OF INSPECTION BY MONTHS FROM JULY 1, 1895, TO JULY 1, 1897.

MONTHS.	No. bbls. oil rejected.	No. bbls. oil approved.	No. bbls. gasoline rejected for illuminating purposes.	Amount of fees received.
1895—				
July	......	12,803	15,127	$ 2,036 65
August	......	17 551	14.194	2,464 80
September	687	22,781	8.931	2,792.85
October	1,172	20,814	9,863	2,691.75
November	216	30,098	2,517	3,157.25
December	10	30,333	2,516	3,159.10
1896—				
January	233	26,990	3,144	2,879.50
February	120	26,662	2,606	2,804 50
March	128	14,332	5,779	1,784 45
April	......	9,285	6,936	1,428.45
May	1	13.096	9,872	2,296.80
June	......	15,961	13,333	2,929.40
July	5	13,584	12,545	2,613 40
August	......	9,466	12,211	2,167.70
September	112	15,831	8,171	2,411.40
October	111	32,929	6,028	3,906.80
November	10	30,564	3,553	3,412.70
December	191	28,412	4,736	3,333.90
1897—				
January	2	29,238	3,426	3,266 60
February	21	22,476	3,924	2,242.10
March	1	23.187	5,241	2.842,90
April	158	13,780	8,328	2,287.60
May	4	14,142	11,442	2,458.80
June	......	9,357	11,100	2,045.70
Total	3,177	483,672	185,523	$63,405 10

EIGHTH BIENNIAL REPORT

OF THE

MINE INSPECTORS

TO THE

GOVERNOR OF THE STATE OF IOWA

FOR THE

TWO YEARS ENDED JUNE 30, 1897.

JAMES A. CAMPBELL, District No. 1; **JAMES W. MILLER**, District No. 2;
MORGAN G. THOMAS, District No. 3.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

DES MOINES:
F. R. CONAWAY, STATE PRINTER,
1897.

BIENNIAL REPORT

OF THE

FIRST DISTRICT,

EMBRACING

Adams, Appanoose, Davis, Lucas, Monroe, Page, Taylor,
Wapello, Warren, and Wayne Counties.

JAMES A. CAMPBELL, INSPECTOR.

REPORT.

To the Honorable F. M. Drake, Governor of Iowa:

SIR—In compliance with the law, I have the honor to present to you herewith my second biennial report on mines and mining for the First district for the two years ending June 30, 1897.

The following report gives the usual tabulated statements, showing the number of mines, shipping and local, and the kind of power used, also the system of working and how ventilated, the number of miners and other employes; a record is also made of fatal and non-fatal accidents.

The First district contains ten coal-producing counties, viz: Adams, Appanoose, Davis, Lucas, Monroe, Page, Taylor, Wapello, Warren, and Wayne. Respectfully submitted,

JAMES A. CAMPBELL,
Inspector First District.

FIRST DISTRICT.

During the past two years, the mines in the First district have been visited as frequently as possible. With few exceptions the sanitary and safe conditions of the mines have been complied with, and it affords me great pleasure to say that up to the present time it has not been necessary to resort to legal proceedings to enforce any of the requirements of the mining laws. Whenever defects have been shown to operators or their agents, they have always been ready to repair or make the improvements as soon as possible, and in such cases it was more from neglect than any other cause. I have had some cases where I have had to take a portion of the men out to get improvements, but in such cases they would be out but a short time.

I appreciate the interest the miners have taken, as well as the operators, as it has lessened the burdens of work in this office.

One of the most important subjects claiming the attention of mine superintendents or bosses is that of the ventilation of the mines. On a suitable amount of air and the circulation of the same depends not only the successful prosecution of the excavation of the mine, but also the lives and health of the miners and laborers who are employed inside. A well constructed fan or furnace is not all that is necessary for the ventilation of a mine. There must be large air-ways, stoppings well built, and good substantial doors well and carefully hung. A fan or furnace may be producing enough air to ventilate the mine, but on account of faulty stoppings, badly constructed doors, and small contracted air courses many places are not sufficiently ventilated. When a mine foreman imagines that when a good fan or furnace is furnished good air is the result, regardless of the surrounding conditions, he is certainly mistaken, for if he would take the trouble to investigate he would find of the amount of air circulating at the face of the working places, under such circumstances, not one-half reaching the working faces. We need more than a well constructed fan or furnace; we need a mine foreman who is thoroughly practical, and who will see that air-ways are kept open, doors properly hung and attended to, and the speed of the fan regulated according to the amount of air needed in the mine. Otherwise the miners cannot expect a proper current throughout the mine. Superintendents should never lose sight of this; it is one of the most important points in running a mine successfully. Doors will always be needed in the mines, but their number can be lessened by splitting the air current several times, and carrying the return over the intake by overcasts. Upon the ability and experience of the inside mine foreman depends largely the ventilation and proper management of the mine, as well as the health and safety of the miners. A mine foreman should be a man of sound judgment, ripe experience, and thorough knowledge, firm and decided in his manner, but at the same time he should be courteous and ever ready to instruct the men in his employ. It certainly seems to me that it is good business economy and a matter of prime importance to have competent men in charge of the mines.

I regret very much to make the statement that during the past two years many of the mines of the First district have not been in operation to exceed one-third time, and quite often visits have been made to these mines when inspections were impossible on account of their being closed.

From a commercial standpoint, both to the operators and miners, the past two years have not been very satisfactory, for a number of reasons, among the foremost of which have been the general depression in business, a shortage of railroad traffic, and close competition from neighboring states. It gives me great pleasure to state that these conditions have recently been materially improved, foreign competition has largely decreased, while railroad traffic has been greatly increased, and the outlook at present is very promising for the future.

TABLE No. 1.

Showing the number of mines, annual output of lump coal, number of miners and other employes, in District No. 1, for the year ended June 30, 1896.

NAME OF COUNTY.	Number of mines.	Number of tons of lump coal produced.	Number of miners employed.	Number of all other employes	Average price per ton for mining.	Total amount paid miners, not including yardage, etc.	Total amount paid all other employes.	Ave selling price per ton for lump coal at mine	Expense of tracking, props, etc. at mines.
Adams	15	21,220	114	38	$1.05	$ 22,281	$ 7,650	$2 20	$ 1,586
Appanoose	74	346,458	1,375	339	.86	297,949	101,170	1 25	6,700
Davis	5	2,800	21	8	.90	2,520	845	1 45	180
Lucas	7	8,500	87	19	1.00	8,500	3,125	1 55	328
Monroe	16	401,650	915	382	.72½	291,196	189,520	1 23	10,385
Page	4	6,420	38	13	1 10	7,062	2,820	2 00	122
Taylor	6	10,100	68	21	1.05	10,605	4 780	1.60	238
Wapello	14	150,405	485	247	.68	102,275	50,860	1.08	3,972
Warren	11	12,120	68	20	.92	11,150	4 065	1 60	655
Wayne	8	30,100	138	32	.87	26,187	11,8[illegible]0	1.22	995
Total	160	989,768	3,329	1,119	$ 79	$ 779,825	$ 379,645	$1.31	$ 25,161

TABLE No. 2.

Showing the number of mines, annual output of lump coal, number of miners and other employes in District No. 1, for the year ended June 30, 1897.

NAME OF COUNTY.	Number of mines.	Number of tons of lump coal produced.	Number of miners employed.	Number of all other employes.	Average price per ton for mining	Total amount paid miners, not including yardage, etc	Total amount paid all other employes.	Ave. selling price per ton for lump coal at mine.	Expense of tracking, props, etc. at mines.
Adams	14	30,500	118	41	$1 05	$ 32,025	$ 10,250	$2.10	$ 1,820
Appanoose	72	372,402	1,455	348	85	316,541	126,150	1 25	7,830
Davis	4	3,120	23	6	.90	2,808	435	1.50	1[illegible]5
Lucas	6	9,055	67	14	1.00	9,055	2,833	1.60	276
Monroe	16	389,706	879	373	.72½	282,536	176,125	1.23	6,535
Page	4	7,250	44	15	1.10	7,950	3,[illegible]	2.00	138
Taylor	6	13,200	82	20	1.00	13,200	3,842	1.70	218
Wapello	14	152,203	413	207	.70	106,542	57,180	1.10	2,114
Warren	11	16,150	62	17	.90	14,535	6,450	1 60	522
Wayne	8	32,120	132	28	.85	27,302	10,115	1.22	812
Total	154	1,025,706	3,275	1,069	$ .79	$812,494	$396,004	$1.26	$20,380

TABLE No. 3.

Coal output of the counties comprising District No. 1, for the past five years.

COUNTY.	1893.	1894.	1895.	1896.	1897.
Appanoose	631,875	528.640	350.000	346,453	372.402
Adams	18,925	30,640	30,000	21.220	30,500
Davis	2 220	2,520	2,900	2.800	3.120
Lucas	10,200	7,564	12,000	8 500	9.055
Monroe	641,805	512,240	313,354	401.650	389,706
Page	1,450	...	4,200	6,420	7,250
Taylor	35,170	35.475	18 000	10.100	13,200
Wapello	279,160	186,748	205,900	150,405	152,203
Warren	14.575	25,474	12,000	12,120	16,150
Wayne	61,835	68,330	45.700	30,100	32,120
Total	1,697,215	1,397,631	994,054	989.768	1,025,706

ACCIDENTS.

There have been twelve fatal and forty non-fatal accidents reported to this office since June 30, 1895. Of these seven were killed by falling slate, two by falling coal, one by a mule, one by an explosion of powder, and one by falling down a shaft.

Of the non-fatal accidents, twenty were injured by falling slate, nine by an explosion of powder, five by falling coal, one by cross head, one run over by a car, one caught between car and timber, and one caught between two cars of coal.

TABLE OF FATAL ACCIDENTS.

In District No. 1 for the two years ended June 30, 1897.

DATE.		NAME OF DECEASED.	CAUSE OF CASUALTY.	NAME OF COMPANY OR MINE.	WHERE LOCATED.
July	25, 1895	Albert M. Harris	Fall of slate	Block Coal company	Brazil, Appanoose county.
July	26, 1895	John Steemer	Fall of coal	Whitebreast Fuel company	Forbush, Appanoose county.
August	2, 1895	Axel Lindstrom	Fall of slate	Spring Hill Coal company	Ottumwa, Wapello county.
October	31, 1895	William Pritchard	Fall of coal	Smoky Hollow Coal company	Avery, Monroe county.
January	12, 1896	George Jones	Fall of slate	Eldon Coal company	Laddsdale, Wapello county.
September	14, 1896	Andrew Johnson	Fall of slate	Smoky Hollow Coal company	Avery, Monroe county.
December	2, 1896	Richard Jones	Fall of slate	Lodwick Coal company	Mystic, Appanoose county.
December	21, 1896	J. D. Rush	Fell into shaft	South Ottumwa Coal company	Ottumwa, Wapello county.
March	17, 1897	Albert Goudy	Kicked by mule	Laddsdale Coal company	Laddsdale, Wapello county.
March	29, 1897	E. S. Johnson	Explosion of powder	Smoky Hollow Coal company	Avery, Monroe county.
March	30, 1897	Steven L. Gordan	Fall of rock	Diamond Coal company	Diamond, Appanoose county.
June	12, 1897	Frank Brown	Fall of slate	South Ottumwa Coal company	Ottumwa, Wapello county.

NON-FATAL ACCIDENTS.

District No. 1.

DATE.	NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
July 10, 1895	Frank Ruly	Miner	Collar bone broken	Fall of coal	Mystic.
July 15, 1895	Ferdiana Behinka	Miner	Face and hands burned	Explosion of powder	Smoky Hollow.
Aug. 18, 1895	Thomas Balyiner	Miner	Lip cut	Fall of slate	Albia.
Sept. 23, 1895	John Richards.	Miner	Leg broken	Fall of slate	Foster.
Oct. 29, 1895	George Kirkendall	Miner	Back injured	Fall of slate	Albia
Nov. 2, 1895	John Quigley	Miner	Leg injured	Fall of coal	Centerville.
Nov. 14, 1895	Lewis A Jones	Laborer	Hip wrenched	Fall of slate	Centerville.
Dec. 7, 1895	J. W. McMannis	Miner	Back injured	Fall of slate	Foster.
Dec. 11, 1895	Wm. Bishop.	Miner	Spinal injuries	Fall of slate	Rathbun.
Dec 13, 1895	Harry Cherry	Miner	Leg broken	Fall of slate	Centerville.
Dec 16, 1895	Charles Bryant	Miner	Hand mashed	Caught between crosshead and cylinder	Centerville.
Dec. 21, 1895	E. Edmunds	Driver	Right leg broken	Fall of rock.	Forbush.
Jan. 2, 1896	Wm Pierson	Driver	Arm broken and spine injured	Run over by car	Smoky Hollow.
Jan. 6, 1896	Richard Williams	Miner	Back injured	Fall of slate	Foster.
Jan. 15, 1896	Charles Fisher	Miner	Back injured	Fall of rock	Foster.
Mar. 10, 1896	John Paveglis	Night man	Thigh broken	Fall of slate	Foster.
Mar. 20, 1896	George Kosliski	Miner	Back injured	Fall of roof	Rathbun.
Mar. 23, 1896	R. G. Breneman	Miner	Leg broken	Fall of coal	Seymour.
April 2, 1896	S. S. Beadle	Driver	Thigh broken	Caught leg between car and timbers	Foster.
April 23, 1896	Wm Slack	Driver	Arm broken	Fall of slate	Foster.
June 26, 1896	Samuel Roberts	Miner	Ankle sprained	Fall of slate	Laddsdale.
July 15, 1896	Frank Ryale	Miner	Compound fracture of ankle bones	Fall of slate	Laddsdale.
Aug 17, 1896	Thomas Bibby	Miner	Hip joint dislocated	Fall of rock	Forbush.
Aug 21, 1896	W. J. Bennett	Miner	Head cut.	Hit by shot	Smoky Hollow.
Aug. 21, 1896	Mathew Taylor	Miner	Upper jaw bone broken	Fall of clod	Forbush.
Aug. 23, 1896	Philip Swab	Miner	Left leg and back injured	Fall of slate	Rathbun.
Oct 17, 1896	John Shusburg	Cager	Left leg broken	Load of coal displaced	Centerville.
Oct 22, 1896	W. S. Parks	Miner	Leg and arm broken	Fall of coal	Jerome.
Oct. 23, 1896	Ben O son	Miner	Leg broken	Fall of coal	Foster.
Oct. 24, 1896	Richard Greenhouse	Miner	Cheek bone broken	Fall of slate	Brazil.
Jan. 26, 1897	Martin McVeltty	Miner	Face and hands burned	Explosion of powder	Foster.
Jan. 26, 1897	John Scott	Miner	Cut and burned on head	Explosion of powder	Foster.
Jan. 26, 1897	F. M. Conners, Jr.	Miner	Face and hands burned	Explosion of powder	Foster.
Jan. 26, 1897	Richard Williams	Miner	Back of head burned	Explosion of powder	Foster.
Jan. 26, 1897	Louis Fogler	Miner	Face and hands burned	Explosion of powder	Foster.
Jan. 26, 1897	John Pierson	Miner	Back hurt and hands burned	Explosion of powder	Foster.
Jan. 26, 1897	Dave Scott	Miner	Face and hands burned	Explosion of powder	Foster.
Jan. 26, 1897	John Farrell	Miner	Face and hands burned	Explosion of powder	Foster.
Feb. 17, 1897	James Robinson	Machine runner	Thigh cut	Caught in cutter bar	Mystic.
May 18, 1897	B. Garlscheck	Miner	Leg broken	Fall of slate	Cedar Mines.

APPANOOSE COUNTY.

In Appanoose county there are seventy-eight mines. Of these sixty are commercial mines. They are situated as follows: Thirty-one on the Chicago, Milwaukee & St. Paul railroad, thirteen on the Keokuk & Western, seven on the Chicago, Rock Island & Pacific, six on the Chicago, Burlington & Kansas City, and three on the Iowa Central railroad The others are local mines. The most prominent are located at or near Centerville There are four mines in the county using coal mining machines. The Centerville Block Coal company's mines, Nos 1, 3 and 9, are using the Legg & Harrison machines, operated by compressed air. The Peerless Coal company is using an electric machine at its No. 3 mine at Mystic. The vein of coal is suitable for machine mining, having a good fire clay bottom and a good roof.

In this county there is only one vein of coal worked, and this is the lower vein of the middle coal measures. It averages about thirty inches in thickness, underlying nearly three fifths of the county, and is very uniform for steam and domestic purposes. This coal is of superior quality and finds ready market in northern Iowa, Minnesota, and Nebraska.

Centerville, Cincinnati, Brazil, Numa, Mystic, Jerome, Rathbun, and Forbush are the principal places where coal is shipped from this county. The mines of this county, generally speaking, are equipped with the latest improved machinery and safety appliances. The most extensive business is done by the Centerville Block Coal company, of Centerville; Whitebreast Fuel company, of Forbush, and the Star Coal company of Rathbun.

When I have had occasion to call attention of operators or superintendents to any defect, they have always tried in all cases, to remedy the same in compliance with the law in the required time given.

On the line of the Chicago, Rock Island & Pacific railroad will be found the following mines: Centerville Block No. 1, Raven, Standard, and Anchor No. 2, located at Centerville; Eldon No 2, at Bellair; Centerville Block No. 2 and Chicago No. 2, located at Numa.

The mines located on the Keokuk & Western are: Centerville Block No. 3 and Anchor No. 2, located at Centerville; Cen-Block Nos. 4, 5, 6, and 7, Columbia No. 3, Co-operative, Phœnix, Silknetter, and Peacock Coal company, located at or near Brazil.

The following mines are located on the Chicago, Burlington & Kansas City railroad: Appanoose, Streator Block, Albert, Thistle, and Merchants, located at or near Cincinnati.

The Royal Coal company operates a mine near Exline. The mines located on the Iowa Central railroad are: Centerville Block No. 3, Centerville Block No. 9, and Whitebreast Fuel company's mine No. 19.

On the Chicago, Milwaukee & St. Paul railroad the following mines will be found: The Star No. 1 and Evans, located at Rathbun; the Darby Block and the Arctic Nos. 1 and 2, located at Darby; Orr Brothers' mine Nos. 1 and 2, Clark & Son, Iowa Block, Peerless No. 3, Union Co-operative, C. L. Arnot, Lodwick Nos. 1 and 2, Iowa & Missouri, Lone Star, Co-operative No. 1, Mystic Fuel company, Mystic Coal company, Akers, Brown & Bowers, Walnut Creek, Twin Mining company, and Herl Coal company, located at or near Mystic; Columbia Nos. 1 and 2, and Hazelton's Coal company's mine, located near Diamond postoffice; Consumers Coal company's mine and Big Joe Nos. 1 and 2, located at Jerome.

NAME OR COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Centerville Block Coal company, No. 1	Alex. Dargavel	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Centerville Block Coal company, No. 2	Alex. Dargavel	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Centerville Block Coal company, No. 3	Alex. Dargavel	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Centerville Block Coal company, No. 4	Alex Dargavel	Centerville	Slope	Room and pillar	Furnace	Horse	Shipping.
Centerville Block Coal company, No. 5	Alex. Dargavel	Centerville	Slope	Room and pillar	Furnace	Horse	Shipping.
Centerville Block Coal company, No. 6	Alex. Dargavel	Centerville	Slope	Room and pillar	Furnace	Horse	Shipping.
Centerville Block Coal company, No. 7	Alex. Dargavel	Centerville	Slope	Room and pillar	Furnace	Horse	Shipping.
Centerville Block Coal company, No. 8	Alex. Dargavel	Centerville	Shaft	Room and pillar	Furnace	Horse	Local.
Centerville Block Coal company, No. 9	Alex. Dargavel	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Anchor Coal company, No. 1	James Wilson	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Anchor Coal company, No. 2	James Wilson	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Whitebreast Fuel company, No. 19	T. J. Phillips	Ottumwa	Shaft	Long wall	Jet	Steam	Shipping.
Star Coal company	George McCleary	Rathbun	Shaft	Long wall	Fan	Steam	Shipping.
Standard Coal company		Centerville	Shaft	Long wall	Fan	Steam	Shipping.
Eldon Coal company, No. 2	John Morris	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Skandinavian Coal company	Claus Johnson	Centerville	Shaft	Room and pillar	Fan	Steam	Shipping.
Tipton Co-operative	A W Buell	Brazil	Slope	Room and pillar	Furnace	Horse	Shipping.
Raven Coal company	A. Highberger	Centerville	Shaft	Room and pillar	Furnace	Steam	Shipping.
Iowa Block Coal company	Gus Pierson	Mystic	Slope	Long wall	Furnace	Steam	Shipping.
Iowa and Missouri Coal company		Mystic	Slope	Long wall	Furnace	Steam	Shipping.
Brazil Coal company	B F. Silknetter	Brazil	Slope	Long wall	Furnace	Horse	Shipping.
Columbia Coal company, No. 1	William Baker	Centerville	Slope	Room and pillar	Furnace	Steam	Shipping.
Columbia Coal company, No. 2	William Baker	Centerville	Slope	Room and pillar	Furnace	Steam	Shipping.
Columbia Coal company, No. 3	William Baker	Centerville	Slope	Room and pillar	Furnace	Horse	Shipping.
Appanoose Coal company	W. H. Jones	Cincinnati	Shaft	Room and pillar	Fan	Steam	Shipping.
Phœnix Coal company	Joseph Turner	Brazil	Slope	Long wall	Furnace	Horse	Shipping.
Thistle Coal company	D. Steele	Cincinnati	Shaft	Room and pillar	Fan	Steam	Shipping.
Streator Block Coal company	D M Richardson	Cincinnati	Shaft	Room and pillar	Furnace	Horse	Shipping.
Albert Coal company	M. Dinning	Cincinnati	Shaft	Room and pillar	Furnace	Horse	Shipping.
Merchants Coal company	J. D Collins	Cincinnati	Shaft	Room and pillar	Fan	Steam	Shipping.
Lodwick Brothers No 1	L. Lodwick	Mystic	Slope	Long wall	Furnace	Horse	Shipping.
Lodwick Brothers, No. 2	L. Lodwick	Mystic	Slope	Long wall	Furnace	Horse	Shipping.

Brown & Bowers		Mystic	Slpeo	Long wall	Furnace	Horse	Shipping.
Mystic Coal company	James Helm	Mystic	Slope	Long wall	Furnace	Horse	Shipping.
Royal Coal company	John Ruch	Centerville	Slope	Long wall	Furnace	Horse	Shipping.
Mystic Fuel company, No. 3	James Seddon	Mystic	Slope	Long wall	Furnace	Horse	Shipping.
Co-operative Coal company	W. C. Green	Mystic	Slope	Long wall	Furnace	Steam	Shipping.
Walnut Creek Coal company	D. C. Bradley	Mystic	Slope	Long wall	Furnace	Steam	Shipping.
Lane Coal company	Daniel Clark	Brazil	Shaft	Long wall	Furnace	Horse	Shipping.
Herl Coal company	Thomas E. Lee	Centerville	Shaft	Long wall	Furnace	Horse	Shipping.
Twin Mining company	Thomas E. Lee	Centerville	Shaft	Long wall	Furnace	Horse	Shipping.
Peerless Coal company, No 3	Thomas E. Lee	Centerville	Slope	Long wall	Furnace	Horse	Shipping.
Orr Brothers, No. 1	A. Orr	Mystic	Slope	Long wall	Furnace	Horse	Shipping.
Orr Brothers, No. 2	A. Orr	Mystic	Shaft	Long wall	Jet	Steam	Shipping.
Clark & Son	A. Clark	Mystic	Shaft	Long wall	Furnace	Horse	Shipping.
Hazelton Coal company	T. D. True	Mystic	Shaft	Room and pillar	Furnace	Horse	Shipping.
Lone Star Coal company	John Seddon	Mystic	Slope	Long wall	Furnace	Horse	Shipping.
Evans Coal company	T. F Evans	Rathbun	Shaft	Long wall	Furnace	Horse	Shipping.
Darby Coal company	P. C McCann	Darby	Shaft	Room and pillar	Fan	Steam	Shipping.
Arctic Coal company, No. 1	William McMurray	Darby	Slope	Long wall	Furnace	Horse	Shipping.
Arctic Coal company, No. 2	William McMurray	Darby	Slope	Long wall	Furnace	Horse	Shipping.
Ackers Coal company	William Porter	Mystic	Shaft	Long wall	Furnace	Horse	Shipping.
C. L. Arnot	William Oughton	Mystic	Slope	Room and pillar	Furnace	Horse	Shipping.
Consumers Coal company	O. D. Wynn	Jerome	Shaft	Long wall	Fan	Steam	Shipping.
Big Joe Coal company, No 1	Henry Miller	Jerome	Shaft	Long wall	Furnace	Steam	Shipping.
Big Joe Coal company, No 2	Henry Miller	Jerome	Shaft	Long wall	Furnace	Horse	Shipping.
Cincinnati Coal company	J. C. McDonald	Cincinnati	Shaft	Long wall	Furnace	Horse	Shipping.
William Lenning & Co	William Lenning	Pearl City	Shaft	Long wall	Furnace	Horse	Shipping.
Peacock Coal company	Thomas Philby	Brazil	Slope	Long wall	Furnace	Horse	Shipping.
Pearl Coal company	H. R. Fox	Pearl City	Shaft	Long wall	Furnace	Horse	Shipping.
Chicago Coal company	George Widmer	Seymour	Shaft	Long wall	Furnace	Horse	Shipping.
Star Coal company	William Cree	Centerville	Shaft	Long wall	Furnace	Horse	Local.
Monitor Coal company	A. D Crawford	Centerville	Shaft	Long wall	Furnace	Horse	Local.
Happy Coal company	Charles Erickson	Centerville	Shaft	Long wall	Furnace	Horse	Local.
North Hill Coal company	William Lynn	Centerville	Shaft	Long wall	Furnace	Horse	Local.
Rock Valley Coal company	L S Hall	Centerville	Shaft	Long wall	Furnace	Horse	Local.
Richard Campbell	Richard Campbell	Brazil	Slope	Long wall	Furnace	Horse	Local.
Fenton Brothers	—— Fenton	Milledgeville	Slope	Long wall	Furnace	Horse	Local.
J. A Stevens	J. A Stevens	Centerville.					
Joseph Hall	Joseph Hall	Centerville.					
William Martin	William Martin	Centerville.					
S. G Houser	S G Houser	Seymour.					
A. Stockdick & Co	A. Stockdick	Milledgeville.					
W. F. Monroe	W. F. Monroe	Exline.					

ADAMS COUNTY.

Adams county has a number of mines in operation at Carbon and vicinity, Briscoe and Eureka and vicinity. The mines of this county, like those of Taylor and Page counties, are working the upper coal measure, which is about eighteen inches thick, and is worked on the long wall system. The coal is all sold at local sales, there being no railroad nearer than Corning, which is located on the Chicago, Burlington & Quincy. The mines are idle during the summer season, running from September until April. Horse power is used for hoisting. The mines employ from five to fifteen men.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of force used.	Shipping or local.
Cullen & Rees	J. Cullen.	Carbon	Shaft	Long wall	Furnace	Horse	Local.
Gibson & Company	G. W. Gibson	Carbon	Shaft	Long wall	Furnace	Horse	Local.
Effee McKee	Effee McKee	Carbon	Shaft	Long wall	Furnace	Horse	Local.
Brittian Coal company	John Thomas	Carbon	Shaft	Long wall	Furnace	Horse	Local.
Thomas Gibble	Thomas Gibble	Carbon	Shaft	Long wall	Furnace	Horse	Local.
Kimpson Bros	—— Kimpson	Carbon	Shaft	Long wall	Furnace	Horse	Local.
John Wilds	John Wilds	Carbon	Shaft	Long wall	Furnace	Horse	Local.
William Chaffee	William Chaffee	Carbon	Shaft	Long wall	Furnace	Horse	Local.
H. Y. Jones	H. Y. Jones	Carbon	Shaft	Long wall	Furnace	Horse	Local.
Lon Franklin	Lon Franklin	Carbon	Shaft	Long wall	Furnace	Horse	Local.
Hartshorn Bros	—— Hartshorn	Eureka	Shaft	Long wall	Furnace	Horse	Local.
William Spurrier	William Spurrier	Eureka	Shaft	Long wall	Furnace	Horse	Local.
James Harson	James Harson	Eureka	Shaft	Long wall	Furnace	Horse	Local.
Henry Hudspeth	Henry Hudspeth	Eureka	Shaft	Long wall	Furnace	Horse	Local.
W. R. Miller	W. R. Miller	Briscoe	Shaft	Long wall	Furnace	Horse	Local.
Thomas Nichols	Thomas Nichols	Briscoe	Shaft	Long wall	Furnace	Horse	Local.

DAVIS COUNTY.

The mines in this county are located near Eldon, Laddsdale and Belknap, and are operated for local trade exclusively. The coal is from three to four feet thick. This county is bounded on three sides by counties that are among the best coal-producing counties in the state: Monroe, Appanoose and Wapello, and still it has not ranked as such. There is little room to doubt that most of the county is underlaid by a good seam of coal, and there is no apparent reason why it should not rank among the best coal-producing counties in the district.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
G. W. Dye	G. W. Dye	Eldon	Slope	Room and pillar.	Furnace	Horse	Local.
J. E Fite	J. E. Fite.	Eldon	Slope	Room and pillar.	Furnace	Horse	Local.
J. Teesdale.	J. Teesdale	Eldon	Slope	Room and pillar.	Furnace	Horse	Local.
Thomas Dial	Thomas Dial	Laddsdale	Slope	Room and pillar.	Furnace	Horse	Local.
John Jordan	John Jordan	Eldon	Slope	Room and pillar.	Furnace	Horse	Local

LUCAS COUNTY.

Lucas county was at one time among the largest coal-producing counties in the First district, and is one of the pioneer counties in the coal trade of the state. At present it looks as though this county was coming to the front again. Mr. William Haven has 8,000 acres of land under option, and has already expended $5,000 in prospecting. The land in question is in the vicinity of Chariton.

At the present time the only mines in operation are small local mines, except two which ship their output; the Lucas and Cleveland Co-operative, at Cleveland, and the Klondike, located at Lucas, on the Chicago, Burlington & Quincy. These two mines are operated by the same company. The local mines of the county are located near Chariton.

LUCAS COUNTY—CONTINUED.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Lucas and Cleveland Co-operative Coal company	J. A. Evans	Lucas	Shaft	Long wall	Furnace	Horse	Shipping.
Klondike Coal company	J. A. Evans	Lucas	Shaft	Long wall	Furnace	Horse	Shipping.
James Griffin	James Griffin	Chariton					Local.
C. Robinson	C. Robinson	Chariton					Local.
James Hall	James Hall	Chariton					Local.
Thomas Smith	Thomas Smith	Chariton					Local.
George N. Six	George Six	Oakley					Local.
William Swanson	William Swanson	Oakley					Local.

MONROE COUNTY.

Monroe county has twelve mines with railroad facilities for shipping their coal. They are located on the Chicago, Burlington & Quincy; Chicago, Milwaukee & St. Paul, and Iowa Central railroads.

Wapello Coal company's mines, Nos. 1 and 2, are located at Hiteman, on a branch line of the Chicago, Burlington & Quincy, running from the main line to Hiteman. This company owns a large coal-field, thoroughly prospected, and will do a large business for years to come. Their mines are equipped with the latest improved machinery. No. 2 is a new mine located one mile north of mine No. 1; operations were commenced the last of January, 1897. It has a capacity of about 400 tons per day at present, and expects in a short time to increase its capacity to 1,000 tons. About 450 men find employment in and around these mines, and later the number of men will be increased.

On a road running from the main line of the Chicago, Burlington & Quincy, at Avery, to Hynes City will be found the Smoky Hollow Coal company's mines, Nos. 1, 2 and 3. No. 3 is a new mine recently opened, and will be in shape by fall to produce a good tonnage. The mines of this company are excellently equipped, and they are at present doing a business that gives employment to 250 men.

On the main line of the Chicago, Burlington & Quincy railroad, three miles west of Albia, the Chicago and Iowa Coal company's mine is located. This is one of the pioneer mines of the county, and is still doing a good business. This mine is well equipped with good machinery and safety appliances.

The Deep Vein Coal company's mine is located on the Chicago, Milwaukee & St. Paul railroad, at Foster. This mine is equipped with modern machinery. They do a business that gives employment to 250 men.

The Whitebreast Fuel company's mine, No. 10, is located one mile from the main line of the Chicago, Burlington & Quincy railroad, at Chisholm. The coal is hauled by means of a tail-rope on the surface from the shaft to the dump at the railroad. This mine is well equipped with modern machinery.

On the Iowa Central railroad, at Hickory, is located mine No. 2 of the Black Diamond Coal company, and at Coalfield, on the same road, is mine No. 1. These mines are well equipped and are doing a good business.

The Central Coal company's mine is located one and one-half miles northeast of Hickory, and connects with the Iowa Central railroad by a switch. This is a new mine opened since our last report. It is equipped with the latest improved machinery and appliances.

The Frederick Coal company's mine is located one mile south of Frederick. Coal is hauled by wagon to the Chicago, Burlington & Quincy railway.

The Star Coal company's mine is located two and one-half miles northwest of Albia. It is well equipped. The coal is sold to local trade at Albia and vicinity. There are a number of small mines in this county that work from four to ten men in the winter season.

Monroe county as a coal producer is among the best counties in the state. The vein of coal that is being worked in this county is from four to six feet in thickness, and is the middle seam of the lower coal measures.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Wapello Coal company, No. 1	P. H. Waterman	Hiteman	Shaft	Room and pillar.	Fan	Steam	Shipping.
Wapello Coal company, No. 2	P. H. Waterman	Hiteman	Shaft	Room and pillar.	Fan	Steam	Shipping.
Smoky Hollow Coal company, No. 1	F. Hynes	Avery	Slope	Room and pillar.	Fan	Steam	Shipping.
Smoky Hollow Coal company, No. 2	F. Hynes	Avery	Slope	Room and pillar.	Furnace	Steam	Shipping.
Smoky Hollow Coal company, No. 3	F. Hynes	Avery	Slope	Room and pillar.	Fan	Steam	Shipping.

MONROE COUNTY--CONTINUED.

NAME OF COMAPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or Local.
Deep Vein Coal company	Robert Hughes	Foster	Shaft	Room and pillar	Fan	Steam	Shipping.
Chicago & Iowa Coal company	Wm. Richardson	Cedar Mines	Shaft	Room and pillar	Furnace	Steam	Shipying.
Whitebreast Fuel company, No. 10	Richard Rosser	Chisholm	Shaft	Room and pillar	Fan	Steam	Shipping.
Central Coal company	Wm. Evans	Lockman	Slope	Room and pillar	Furnace	Steam	Shipping.
Diamond Coal company, No. 1	A. B. Little	Coalfield	Slope	Room and pillar	Fan	Steam	Shipping.
Diamond Coal company, No. 2	A. B. Little	Coalfield	Shaft	Room and pillar	Fan	Steam	Shipping.
Frederick Coal company	J. W. Scovey	Frederick	Shaft	Long wall	Furnace	Steam	Shipping.
Gardner Coal company	George Sedwick	Frederick	Shaft	Long wall	Furnace	Horse	Shipping.
Star Coal company	N. A. Flanders	Albia	Shaft	Room and pillar	Fan	Steam	Local.
Remey Bros	Wm Remey	Albia	Slope	Room and pillar	Furnace	Horse	Local.
W. D. Russell	W. D. Russell	Albia	Slope	Room and pillar	Furnace	Horse	Local.
Smiley Bros	Smiley Bros	Albia	Slope	Room and pillar	Furnace	Horse	Local.
Hartzer Bros	Hartzer Bros	Albia	Slope	Room and pillar	Furnace	Horse	Local.
John K. Manley	John K. Manley	Albia	Slope	Room and pillar	Furnace	Horse	Local.
George Combs	George Combs	Albia	Slope	Room and pillar	Furnace	Horse	Local.

PAGE COUNTY.

The coal in this county is thin and does not exceed twenty inches. The seam belongs to the upper coal measures. Page county is not one of the important coal counties of the state, although mining has been done for a long time. Mines are being operated in the vicinity of Clarinda and Shambaugh. William Turner and George Howard are the most prominent operators in the county. There are several mines that work four or five men in the winter season, but change ownership so frequently it is hard to enroll them.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
George Howard	George Howard	Shambaugh	Slope	Long wall	Furnace	Horse	Local.
William Turner	William Turner	Shambaugh	Slope	Long wall	Furnace	Horse	Local.
Charles Pierson	Charles Pierson	Clarinda	Slope	Long wall	Furnace	Horse	Local.

TAYLOR COUNTY.

Taylor county has two mines with railroad facilities for shipping their output. They are the Anderson and Campbell mines, located at New Market, on the Humeston & Shenandoah railroad. The vein worked in this county is of the upper coal measures, and is from sixteen to twenty inches in thickness, and is worked long wall. Charles Adams and William Welch operate mines for local trade near New Market. There are several small mines in the western and northwestern parts of the county that employ from three to five men in the winter season.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Campbell Coal company	Richard Campbell	New Market	Shaft	Long wall	Furnace	Horse	Shipping.
Anderson Coal company	William Anderson	New Market	Shaft	Long wall	Furnace	Horse	Shipping.
Powell & Lathrop	—— Lathrop.	New Market	Shaft	Long wall	Furnace	Horse	Local.
Charles Adams	Charles Adams	New Market	Shaft	Long wall	Furnace	Horse	Local.

WARREN COUNTY.

A number of small mines are operated in this county. Three have shipping facilities. The others are worked exclusively for local trade. The coal in this county varies in thickness from twenty inches to three feet. With an outlet to the western markets, Warren county would become prominent as a coal producer. The mines at or near Sumner are working the middle coal measures, three feet thick. The coal is of a good quality. The mines at Ashworth and Milo are working in the upper vein of coal, which is from twenty to twenty-four inches in thickness. These mines are operated only during the winter months, and from four to eight men do the work at each mine.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Caldwell & Wishman		Summerset	Shaft	Room and pillar	Furnace	Horse	Shipping.
D. K. Jones	D. K. Jones	Summerset	Shaft	Room and pillar.	Furnace	Horse	Shipping.
Wm. Lumsden & Son	Wm. Lumsden	Summerset	Shaft	Room and pillar.	Furnace	Horse	Local.
W. S. Bennum	W. S. Bennum	Summerset					Local.
D. S. Sayers	D. S. Sayers	Summerset					Local.
John Lannigan	John Lannigan	Summerset					Local.
Frank Murphy	Frank Murphy	Indianola					Local.
Grant Weston	Grant Weston	Indianola					Local.
Johnson & Son	Johnson & Son	Ackworth					Local.
Jamison Bros	Jamison Bros.	Ackworth					Local.
John Brown	John Brown	Milo					Local.
Sid Bryant	Sid Bryant	Milo					Local.

WAYNE COUNTY.

Wayne county has eight mines in operation. The two shipping mines, the Chicago Coal company and the Seymour Coal company, are located at Seymour. The Chicago Coal company has facilities for shipping coal over the Chicago, Milwaukee & St. Paul and the Chicago, Rock Island & Pacific railroads. The Seymour Coal company ships its coal over the Chicago, Rock Island & Pacific railroad.

The coal in this county is thirty inches in thickness, and is the middle vein of the lower coal measures. It is good coal for both steam and domestic purposes.

There are six mines in the vicinity of Seymour, Confidence and Bethlehem that are operated for local trade only. There are several small mines in the county that work from three to five miners in the winter season.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or Local.
Chicago Coal company	Peter Thomas	Seymour	Shaft	Long wall	Fan	Steam	Shipping.
Seymour Coal company	George Elmore	Seymour	Shaft	Long wall	Fan	Steam	Shipping.
Lewis Fry	Lewis Fry	Confidence	Shaft	Long wall	Furnace	Steam	Local.
William L. Rousson	William Rousson	Confidence	Slope	Long wall	Furnace	Horse	Shipping.
L. Atwell	L. Atwell	Confidence	Slope				Local.
L. Brown	L. Brown	Confidence	Slope				Local.
M. H. Roe	M. H. Roe	Confidence					Local.
Aaron Radcliff	Aaron Radcliff	Confidence	Slope				Local.
William Burns	William Burns	Confidence					Local.
B F. Jared	B F. Jared	Bethlehem					Local.

WAPELLO COUNTY.

Wapello county has six commercial and fourteen local mines, all working in the lower coal measures. The vein is from four to five and one-half feet thick.

The Whitebreast Fuel company's mine No. 22, located at Keb, on a branch of the main line of the Chicago, Burlington & Quincy railroad, is one of the largest mines of the district. The mine is equipped with modern machinery and safety appliances.

The Phillips Fuel company's mines Nos. 3 and 4 are located on the Chicago, Milwaukee & St. Paul railroad, four miles northwest of Ottumwa. Coal is hauled from No 3 mine, a distance of one mile, by means of a tram road to No. 4, where it is loaded for shipment. The mines are equipped with good machinery and safety appliances in accordance with the law. This company has done a great deal of prospecting during the past year with the intention of opening more new mines.

Two and one-half miles northwest of Ottumwa, on the same road, is located the Lumsden Coal company's Diamond mine No. 1. Besides doing a railroad business, this company has a good local trade. Their mine is equipped with good machinery and safety appliances according to law.

The Eldon Coal and Mining company's mine No 1 is located on the Chicago, Rock Island & Pacific railroad, at Laddsdale. The mine is equipped with modern machinery, and has been doing quite a business during the depression in the coal trade.

The Appanoose Coal and Fuel company's mine is on the line of the Chicago, Milwaukee & St. Paul railroad, located at Willard, and is equipped with modern machinery.

The most prominent local mines are: Burch Fuel company's No 2, South Ottumwa Coal and Mining company, Daniels Coal company, Black Hawk Coal company, Swede Valley Coal company, Robert Parker, Sweeney Bros., Baker Coal company, and Adams Coal company, located at or near Ottumwa.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Whitebreast Fuel company, No. 22	T. J. Phillips	Ottumwa	Shaft	Room and pillar	Fan	Steam	Shipping.
Phillips Fuel company, No. 3	William Foulks	Ottumwa	Shaft	Room and pillar.	Fan.	Steam	Shipping.
Phillips Fuel company, No. 4	William Foulks	Ottumwa	Shaft	Room and pillar.	Fan	Steam	Shipping.
Lumsden Coal company, Diamond No. 1	John Lumsden	Ottumwa	Shaft.	Room and pillar.	Fan	Steam	Shipping.
Eldon Coal company	Thomas Binks	Ottumwa	Shaft	Room and pillar.	Fan	Steam	Shipping.
Appanoose Coal company	Charles McCarroll	Ottumwa	Shaft	Room and pillar	Fan.	Steam	Shipping.
Burch Bros , No. 2	E. D. Burch	Ottumwa	Slope	Room and pillar.	Fan	Steam	Local.
South Ottumwa Coal and Mining company	Elmer Grooms	Ottumwa	Shaft	Room and pillar.	Furnace	Horse	Local.
Baker Coal company	W. J. Baker	Ottumwa	Shaft	Room and pillar.	Fan	Steam	Local.
Daniel's mine	John Daniels	Ottumwa	Shaft	Room and pillar	Fan	Steam	Local.
Black Hawk Coal company	A. C. Caughlin	Ottumwa	Shaft	Room and pillar	Furnace	Steam	Local.
Adams Coal company	A. P. Adams	Ottumwa	Shaft	Room and pillar.	Furnace	Horse	Local.
Spring Valley Coal company	John Wing	Ottumwa	Shaft	Room and pillar.	Furnace	Horse	Local.
Sweeney Bros	Sweeney Bros	Ottumwa	Shaft	Room and pillar.	Furnace	Horse	Local.
George Rayerson	George Rayerson	Kirkville	Shaft	Room and pillar.	Furnace	Horse	Local.
W. G. Davis	W. G. Davis	Kirkville	Shaft	Room and pillar.	Furnace	Horse	Local.
G. Smith	G. Smith	Kirkville	Shaft	Room and pillar.	Furnace	Horse	Local.
John Thompson	John Thompson	Kirkville	Shaft	Room and pillar	Furnace	Horse	Local.
Swede Valley Coal company	Gus Johnson	Ottumwa	Shaft	Room and pillar	Furnace	Horse	Local.
Robert Parker	Robert Parker	Ottumwa	Shaft	Room and pillar.	Furnace	Horse	Local.
Hall & McMann	George Hall	Ottumwa	Shaft	Room and pillar	Furnace	Horse	Local.

IMPROVEMENTS MADE IN MINES DURING THE LAST TWO YEARS.

APPANOOSE COUNTY.

NAME OF MINE.	Air shaft.	Second opening.	Stairway.	Cover on cages.	Safety catches.	Safety gates.	Brake on drum.	Fan.	Furnace.	Trailer or dog.	Safety block.
Centerville Block Coal company	....	3	...	4	4	4	....	....	1	....	...
Co-operative Coal company	..	1	....	....	....	....	1	...	1	1	1
Chicago Coal company	1	..	....	....	....	....	....	....	1	....	...
Thistle Coal company	....	1	....	....	....	....	....	1	....	....	...
Merchants Coal company	....	1	....	...	....	...	....	....	....	....	...
Total	1	6	....	4	4	4	1	1	3	1	1

LUCAS COUNTY.

Lucas and Cleveland Co-operative	....	1	...	....		....	...	.. .	....	....	...
Total	..	1	...	..	....	....	....	....	..	....	...

MONROE COUNTY.

Wapello Coal company	1	1	...	2	2	2	1	1	....	....	...
Smoky Hollow Coal company	1	..	...	....	....	....	1	1	....	1	1
Central Coal company	1	...	...	....		...	1	....	1	1	1
Star Coal company	....	....	...	1	1	1	1	1	....	....	...
Total	3	1	....	3	3	3	4	3	1	2	2

WAPELLO COUNTY.

Burch Bros. Fuel company	1	....	....	....	...	....	1	1	....	1	1
South Ottumwa Coal and Mining company	....	1	....	....	....	....	1	...	....	....	...
Lumsden Coal company	....	....	....	. ..	....	....	...	1	....	....	...
Total	1	1	....		....		2	2	....	1	1

NEW MINES AND MINES ABANDONED.

There have been nine new mines opened in this district since my last report. Of these five are shafts and the remainder are slopes The Chicago Coal company's mine No. 2, located at Numa, and the Co-operative Coal company's mine No. 2, located at Mystic, in Appanoose county. The Wapello Coal company's mine No. 2, located at Hiteman; Smoky Hollow Coal company's mine No. 3, located at Hynes City; Central Coal company's mine No. 1, located at Lockman, and the Star Coal company's mine, located three miles northwest of Albia, in Monroe county. The Black Hawk Coal company, Swede Valley Coal company and the Burch Fuel company, located near Ottumwa, in Wapello county.

There have been four mines abandoned, viz.: The National Coal company, at Centerville; the Enterprise Coal company, and the Iowa and Wisconsin Coal company, west of Albia, and the Burch Fuel company, at Ottumwa.

OIL AND SCALE LAW.

A mining law enacted by the Twenty-sixth General Assembly made it obligatory upon the state mine inspectors to inspect all oil used for illuminating purposes. I have made 105 inspections of oil at stores and mines in this district. All the operators were notified of this law, but there were merchants in various parts of the district who were not connected with the mines, but who were handling oil, and it was hard to get them to understand that they must comply with the mining law if they sold miners' oil.

I have had occasion to test seventeen sets of scales at different mines during the present term, and found them working in good order, with the exception of seven, which were weighing incorrectly, but when the operators or agents were notified of the defect they were always ready to have them adjusted as soon as possible.

BIENNIAL REPORT

OF THE

SECOND DISTRICT,

EMBRACING

Jasper, Jefferson, Keokuk, Mahaska, Scott and Van Buren Counties.

J. W. MILLER, INSPECTOR.

REPORT.

To His Excellency, F. M. Drake, Governor of Iowa:

SIR—In conformity with the requirements of the mining laws, I have the honor to submit herewith to you the report of this district for the biennial period ending June 30, 1897. In it are included the usual statistical tables, a list of the improvements made during that time, a record of all accidents, both fatal and non-fatal, together with such other matters as I deemed of importance in this connection.

It affords me great pleasure to report that the condition of the coal trade has improved very materially in this district during the past year, and despite the fact that the prices paid for mining have not advanced the miners have earned considerable more money from the fact that they have had, at a great many of the mines, steady employment, and the pleasant prospect in view that if the present brisk demand continues prices are certain to advance.

J. W. MILLER,
Mine Inspector Second District.

SECOND DISTRICT.

The Second district comprises the following counties: Mahaska, Keokuk, Jasper, Scott, Jefferson, Van Buren and Lee. During the past two years there have been opened and equipped five new shipping mines. The shipping mines of this district have worked during the last half of the biennial period nearly full time, some reporting 250 days' work from June 30, 1896, to June 30, 1897. There are about 100 mines in this district, with an output of 3,048,940 tons of coal for the two years ending June 30, 1897, an increase over the last biennial period of 238,484 tons.

A WORD ON VENTILATION.

To properly understand the distribution of air through the mine is the science of ventilation. Even at this late date of modern improvement in ventilating machinery, ventilation is far from being thoroughly understood by a great many who have charge of mines in this state; yet there are abundant opportunities which, if grasped and followed up, would enable the practical and progressive to thoroughly study and master the subject. In ventilating a mine, it is absolutely necessary that the air be carried up to the working places and properly distributed. To have the air come down one shaft and travel the air-ways and entries in a large volume, whilst at the working face there is scarcely sufficient air to support combustion for the light of a pit-lamp, is not ventilation. However efficient a fan or furnace may be, the combined efforts may be defeated by defective, incompetent management, or by other defects. As a miner spends a large portion of his life in the mine, his health, comfort and life are largely dependent upon good ventilation. If this is not properly furnished, he must breathe an atmosphere impregnated with the exhalation of the human, the animal, and the gases from lamps, powder and refuse throughout the mine. All of these tend incessantly to envelop him in an atmosphere unfit for respiration.

ARBITRATION.

The importance and value of arbitration has been fully recognized by different countries and classes. Why should not this be made a benefit to our own people of this state? If arbitration works well between nations, it should work well between individuals. Let a board of arbitration be created to be appointed by the governor, or elected by the senate, who shall be men having the qualifications to handle such important questions and who command the respect and confidence of all, both capital and labor. Such a commission would have access to all the information necessary to enable them to settle the different disputes that arise between employer and employe. This method, in my opinion, would save a great deal of unwritten misery that often exists during strikes, as well as the ill feeling that continues to exist after a strike is settled between employer and employe.

OILS.

The Twenty-sixth General Assembly passed a law requiring all oils used for illuminating purposes in our mines to be pure animal or vegetable oil or paraffine. This law, since going into effect, has been of great value to those working underground. It affords me great pleasure to say that I have every reason to believe that the law governing our oils used for illuminating purposes in our mines in this district is being properly complied with. While there has been quite a number of barrels of oil condemned for the reason that it would not stand the test, there has been no deliberate violation of the law, and I am gratified to know that the law is accomplishing all that was intended by its enactment.

STRIKES.

There have been only two strikes of any importance in this district during the past two years. The miners of the Jasper County Coal and Mining company came out in the early spring of 1896, to resist a reduction in the price of mining. They were out about eight weeks when the company imported about eighty colored men and put them to work. This broke up the strike, and in a short time most of the old miners were back at work. Since that time this mine has worked steadily.

About August 15, 1896, the miners employed in the mines at What Cheer came out on a strike. They had several small grievances which they sought to have adjusted. At the time they came out they were weighing coal on top before screening, but after the strike was settled, which lasted ten or twelve weeks, the coal was weighed after being screened.

TABLE No. 1.

Showing the number of mines, annual output of lump coal, number of miners and other employes in District No. 2 for the year ending June 30, 1896.

NAME OF COUNTY.	Number of mines.	Number of tons of lump coal produced.	Number of miners employed.	Number of other employes.	Average price paid for mining.	Amount paid miners, not including yardage, etc.	Total amount paid other employes.	Average selling price lump coal per ton at mine.	Average expense for tracking, timber, props, etc.	Capital invested.
Jasper........	20	121,200	280	100	$ .80	$ 96.960	$ 39,500	$1.29	$ 13,000	$ 240,000
Jefferson.....	9	4,200	21	5	.90	3,780	610	1.75	500	8,000
Keokuk......	14	222,300	410	185	.75	166,725	69,400	1.30	34,500	260,000
Mahaska.....	88	1,100,900	1793	720	.75	825,675	261,250	1.26	120,000	980,000
Scott.........	8	13,100	48	16	1.00	13,100	1,950	1.60	730	13,400
Van Buren ..	7	15.000	89	10	.90	13,500	2,240	1.75	800	12,300
Total...	96	1,476,700	2591	1036	$ .75	$1119,740	$ 374,750	$1.27	$ 169,530	$ 1,513,700

TABLE No. 2.

Showing the number of mines, annual output of lump coal, number of miners and other employes in District No. 2 for the year ending June 30, 1897.

NAME OF COUNTY.	Number of mines.	Number of tons of lump coal produced.	Number of miners employed.	Number of other employes.	Average price paid for mining.	Amount paid miners, not including yardage, etc.	Total amount paid other employes.	Average selling price lump coal per ton at mine.	Average expense for tracking, timber, props, etc.	Capital invested.
Jasper........	21	158,000	291	110	$ .74	$ 114,750	$ 42,450	$1.25	$ 16,000	$ 263,000
Jefferson.....	9	5,000	27	6	.90	4.500	750	1.75	550	8.000
Keokuk......	15	201,600	396	190	.75	151,200	51,300	1.27	32,400	281,000
Mahaska.....	40	1,184,840	1756	715	.75	888,630	274,600	1.20	130,000	1,205,000
Scott.........	8	13,500	47	10	1.00	13,500	2,700	1.60	600	13,400
Van Buren ..	6	14,300	35	9	.90	12,870	2,650	1.75	675	14,500
Total...	100	1.572.240	2552	1040	$ .75	$1185,450	$ 374.450	$1.22	$ 180,225	$ 1,784.900

NOTE—The above tables do not contain the salaries of superintendents, mine foremen, or other officials; neither do they contain the royalty that the different companies pay on coal.

TABLE No. 3.

Output of coal of the counties comprising District No. 2 for the past five years.

COUNTIES.	1893.	1894.	1895.	1896.	1897.
Mahaska	1,172,530	965.676	902,430	1,100,900	1,184,840
Keokuk	272,150	215,625	260,000	222,300	201,600
Jasper	292,000	240,985	160,300	121,200	153,000
Scott	14,500	13,500	10,100	13,100	13,500
Jefferson	4,940	4,840	4,000	4,200	5,000
Van Buren	28,680	22,000	11,000	15,000	14,300
Total	1,784,800	1,462,626	1,347,830	1,476,700	1,572,240

JASPER COUNTY.

Jasper county has at present about twenty mines, located in different parts of the county. There are fifteen shaft mines. The balance are slope or drift mines.

In the early part of the year 1896, a strike at the Jasper County Coal company's mines, before mentioned, reduced the total tonnage for the biennial period a good many thousand tons, for their capacity at that time was from 700 to 850 tons of lump coal, and the mine was idle about eight weeks.

Jasper County Coal company's mines Nos. 3 and 4 are located on the Iowa Northern railway about half way between Colfax and Valeria, No. 4 being a new plant opened and equipped within the past six months. The coal from No. 4 is hauled by an endless rope system over a double track on top of ground to the tipple at No. 3 mine, a distance of 1,600 feet, where the coal is handled over the same chute as No. 3 coal. Little Diamond Coal company's mine is located two and one-half miles north of Colfax, delivering most of its product to Colfax. Thos. Hanson, Jno. Gunter, and several other local mines are located from two to three miles east of Colfax, and furnish a good supply of coal to brick yards in that locality. There are several local mines south of Newton, the largest being the Snook's coal mine, two and one-half miles south, French Coal company's mine, three and one-half miles south, and the Carson Coal company's mine, two and one-half miles southwest. Several have been abandoned within the last two years, and some three or four new openings have been made. South of Prairie City or near Vandalia there are some five or six local mines that furnish considerable coal during the year to Prairie City, Vandalia, and surrounding country.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Jasper County Coal company	Henry Thomas	Colfax	Shaft	Room and pillar.	Fan	Steam	Shipping.
Little Diamond Coal company	Henry Thomas	Colfax	Shaft	Room and pillar.	Fan	Steam	Local.
Thomas Hanson	Thomas Hanson	Colfax	Shaft	Room and pillar.	Furnace	Horse	Local.
John Gunter	John Gunter	Colfax	Shaft	Room and pillar.	Furnace	Horse	Local.
Brown & Brice	Robert Brown	Prairie City	Shaft	Room and pillar.	Furnace	Horse	Local.
Crawford & Shultz	John Crawford	Vandalia	Shaft	Room and pillar.	Furnace	Horse	Local.
Walker Mine	John Waddel	Vandalia	Shaft	Room and pillar.	Furnace	Horse	Local.

JASPER COUNTY--CONTINUED,

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Snook's Coal company	Wm. Snook	Newton	Shaft	Room and pillar.	Fan.	Horse	Local.
Robert Carson	Robert Carson	Newton	Shaft	Room and pillar.	Furnace	Horse	Local.
T. F. Welsh	T. F. Welsh	Newton	Shaft	Room and pillar.	Furnace	Horse	Local.
Wm. Burgess	Wm. Burgess	Metz	Shaft	Room and pillar	Furnace	Horse	Local.
Robert Marshall	Robert Marshall	Draper	Shaft	Room and pillar.	Furnace	Horse	Local.
Wm. White	Wm. White	Vandalia	Shaft	Room and pillar.	Furnace	Horse	Local.
French Coal company	E. P. French	Newton	Shaft	Room and pillar.	Fan	Steam.	

JEFFERSON COUNTY.

Coal has been mined in commercial quantities in Jefferson county for a greater period probably than any other similar district in the state. This is probably due to the early settlement and to the small expense it requires to open a mine in a great many places in the county, owing to the exposures of coal and coal measures in the hills. The vein of coal in this county is of very good quality and runs from three to four and one-half feet in thickness.

The largest mines worked in this county were located at Perlee, northeast of Fairfield, which are now worked out. The Brown mine has been in operation for years, and is located at Coalport, near the edge of the county line. Along Cedar creek south and west of Fairfield, coal has been worked for many years. Directly south of town and just west of where the Birmingham road crosses the creek, the Bates mine is located, shaft sixty feet deep, coal about four feet in thickness. Most of its coal is hauled to Fairfield.

South of Libertyville about three miles is the Zimmerman mine. West of this mine is the Beyer mine. Other country banks are in operation in this neighborhood.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
A. J. Zimmerman	A. J. Zimmerman	Libertyville	....	Room and pillar.	Furnace	Horse	Local.
W. W. Laughlen	W. W. Laughlen	Libertyville	....	Room and pillar	Furnace	Horse	Local.
George Bates	George Bates	Fairfield	....	Room and pillar.	Furnace	Horse	Local.
Thomas Russell	Thomas Russell	Fairfield	....	Room and pillar	Furnace	Horse	Local.
John Clark	John Clark	County Line	....	Room and pillar.	Furnace	Horse	Local.
Beyer mine	....	Libertyville	....	Room and pillar.	Furnace	Horse	Local.
Snooks mine	....	County Line	....	Room and pillar.	Furnace	Horse	Local.

KEOKUK COUNTY.

Keokuk county is one of the large coal-producing counties. The North and South Skunk rivers run diagonally across the county. The principal mines now being worked are north of North Skunk, within a radius of five miles of What Cheer. The Crescent Coal company's mine is located four miles northwest of What Cheer, on a switch from the Chicago & North-Western railway. The North Star Coal company's mine is located on the Burlington, Cedar Rapids & Northern, three miles north of What Cheer. What Cheer Coal company's mine, No. 4, is located on the Burlington, Cedar Rapids & Northern. The Pioneer Coal company's mine is located on a switch running up to the North Star Coal company's mine No 1. The Thomas Bros. Coal company has opened up a new mine on the Chicago & North-Western railway, above the Crescent mine. The Tower Coal company has a mine two miles south of What Cheer, on the Chicago & North-Western railway. The Columbia Coal company's mine is located on a switch from the Chicago & North-Western railway, running over to Wapaluka; this mine is about worked out.

There are six railroads running through this county. With such railroad facilities there is bound to be a great deal of prospecting done, and no doubt a number of pockets of coal that now underlie this county will be discovered in the near future.

There are quite a number of good local mines throughout this county, having a good trade during cold weather only, except those located near a brick yard or some public works.

KEOKUK COUNTY—CONTINUED.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Crescent Coal company	James Chew	What Cheer	Shaft	Room and pillar.	Fan	Steam	Shipping.
North Star Coal company	Robert Geenhaulgh.	What Cheer	Shaft	Room and pillar.	Fan	Steam	Shipping.
Pioneer Coal company	M. A. Hollingsworth	What Cheer	Shaft	Room and pillar.	Fan	Steam.	Shipping.
What Cheer Coal company	E. M. Trescut	What Cheer	Shaft	Room and pillar.	Fan	Steam	Shipping.
Thomas Bros.' Coal company	John Thomas	What Cheer	Slope	Room and pillar.	Furnace	Steam	Shipping
Toward Coal company	W S. Toward	What Cheer	Shaft	Room and pillar.	Fan	Steam	Shipping.
Thomas Thompson	Thomas Thompson	What Cheer	Shaft	Room and pillar.	Furnace	Horse	Local.
E. Mayar.	E. Mayar.	What Cheer	Shaft	Room and pillar	Furnace	Horse	Local.
William Blatt	William Blatt	What Cheer		Room and pillar.	Furnace	Horse	Local.
O. W. Olive	O. W. Olive	Delta		Room and pillar.	Furnace.	Horse	Local.
Martin Fisher	Martin Fisher	Delta		Room and pillar.	Furnace	Horse	Local.
Charles Cordis	Charles Cordis	Richland		Room and pillar	Furnace	Horse	Local.
Thomas Turnbull	Thomas Turnbull	Packwood		Room and pillar.	Furnace	Horse	Local.

MAHASKA COUNTY.

From the earliest days of settlement of the Des Moines valley Mahaska county has ranked among the leading coal producing counties of Iowa. In the early forties coal was found within the limits of Mahaska, and along in the seventies there was announced to the world the existence of rich deposits of mineral fuel in central Iowa. Mining, therefore, early became an important industry in this section of the state.

If the shipping mines of this county were operated up to their fullest capacity they would produce 7,500 tons of lump coal per day, or, by working 300 days in the year, would produce 2,250,000 tons of lump coal, requiring 3,400 miners to mine this coal, and 1,100 day men in and around the mines.

Mahaska county has within her borders thirty-eight coal mines, eighteen of them being shipping mines, controlled by the following companies:

The Consolidation Coal company, of Muchakinock, located at the terminal of the Belle Plaine branch of the Chicago & North-Western railway, has four mines, Nos. 6, 7, 8, and 9. Nos. 6 and 7 are located on a branch running northwest from Muchakinock yard. No. 8 is located on the branch running northwest five miles from the yard. No. 9 is a new plant, the shaft being sunk and equipped with all modern improvements within the past year. Trains leave Muchakinock each morning with the men for the different mines, and return the men in the evening. This company has in its employ about 600 men.

The American Coal company, of Oskaloosa, has two mines, Nos. 2 and 4. They have within the past two years put in at their No. 2 mine a tail rope system to haul the coal from the inside partings to the endless rope parting, the endless rope then hauling it a distance of one and one-fourth miles to the bottom of slope. No. 4 shaft has been sunk and equipped within the past two years. No. 2 mine is located at Evans on the Chicago, Rock Island & Pacific railway. No. 4 mine is one mile west of No. 2 on the Chicago, Rock Island & Pacific railway. The American has in its employ 425 men.

Oskaloosa Coal company, of Oskaloosa, has three mines, Nos. 2, 3, and 4. No. 2 is located on switch from Chicago, Rock Island & Pacific railway, one mile west of Beacon. No. 3 is located on the Chicago, Rock Island & Pacific railway, two and one-half miles south of Beacon. No. 4 is one and one-half miles south of No. 3, and has in its employ 150 men. No. 4 is located on a branch of the Chicago & North-Western railway, running up to the Consolidation Coal company's No. 8 mine. The company employs all told 300 men.

Whitebreast Fuel company's mine No. 28, located at Pekay on the Iowa Central railway, employs 300 men.

Iowa Fuel company, of Oskaloosa, has a mine located on the Chicago & North-Western railway at Colon, and employs 245 men.

Lost Creek coal company, of Oskaloosa, employs 215 men. The company has one mine at Lost Creek on the company's railway running from the mine to Stark, and connecting with the Iowa Central railway and the Burlington & Western railway.

Garfield Coal company, of Oskaloosa, has a slope mine northwest of Beacon, on the Chicago, Rock Island & Pacific railway, employing 165 men.

M. B. Foster Coal company, of Des Moines, has a mine located on the Chicago, Rock Island & Pacific railway at Fishville. Employs 145 men.

Hoover's Coal company, of Carbonado, is located on the switch running from main line of Iowa Central railway up to Carbonado.

Long Brothers, of Oskaloosa, are located on switch off the Burlington & Western railway.

There are several local mines that haul coal to the cars on railroads by wagon. There have been several small mines opened during the last biennial period in different parts of the county.

MAHASKA COUNTY—CONTINUED.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Consolidation Coal company	B. C. Buxton	Muchakinock	Sh &Sl.	Room and pillar.	Fan	Steam	Shipping.
American Coal company	W. A. McNeill	Oskaloosa	Slope	Room and pillar.	Fan	Steam	Shipping.
Oskaloosa Coal company	John H. Ramsay	Oskaloosa	Sh &Sl.	Room and pillar.	Fan	Steam	Shipping.
Excelsior coal company	George H. Ramsay	Carbonado	Shaft	Room and pillar.	Fan	Steam	Shipping.
Iowa Fuel company	E. C. Smith	Oskaloosa	Shaft	Room and pillar.	Fan	Steam	Shipping.
Whitebreast Fuel company	D. O. Campbell	Pekay	Shaft	Room and pillar	Fan	Steam	Shipping.
Garfield Coal company	George H. Ramsay	Oskaloosa	Slope	Room and pillar.	Fan	Steam	Shipping.
M. B. Foster Coal company	B. F. Montgomery	Fishville	Shaft	Room and pillar.	Fan	Steam	Shipping.
Columbian Coal company	W. F. Durfee	Rose Hill	Shaft	Room and pillar.	Fan	Steam	Shipping.
Long Brothers	Henry Long	Oskaloosa	Shaft	Room and pillar.	Jet	Steam	Shipping.
Lost Creek Coal company	E. C. Smith	Oskaloosa	Shaft	Room and pillar.	Fan	Steam	Shipping.
Hawarth Coal company	D. Hawarth	Oskaloosa	Shaft	Room and pillar	Jet	Steam	Shipping.
Economy Coal company	B. F. Evans	Oskaloosa	Shaft	Room and pillar.	Fan	Steam	Local.
Superior Coal company	H. A. Hood	Beacon	Slope	Room and pillar	Fan	Steam	Shipping.
Hoover Coal company	C. A. Hoover	Carbonado	Shaft	Room and pillar.	Fan	Steam	Local.
Guthrie Coal company	J. D. Guthrie	Oskaloosa	Shaft	Room and pillar.	Fan	Steam	Local.
Cook Coal company	P. Cook	Oskaloosa	Shaft	Room and pillar.	Furnace	Horse	Local.
D. O. Steen	D. O. Steen	Oskaloosa	Shaft	Room and pillar.	Furnace	Horse	Local.
Logue Coal company	J. Logue	Oskaloosa	Shaft	Room and pillar.	Furnace	Horse	Local.
William Evans	William Evans	New Sharon	Shaft	Room and pillar.	Furnace	Horse	Local.
William Paterson	William Paterson	Leighton	Shaft	Room and pillar	Furnace	Horse	Local.
Mike Carey	Mike Carey	Rose Hill	Shaft	Room and pillar.	Furnace	Horse	Local.
R. C. Davis	R. C. Davis	Leighton	Shaft	Room and pillar.	Furnace	Horse	Local.
Kennebeck Coal company	Andrew Love	Muchakinock	Shaft	Room and pillar.	Furnace	Horse	Local.

SCOTT COUNTY.

Scott county has some eight or ten coal mines. The coal is about three to three and one-half feet thick, and is of an excellent quality, underlying a splendid roof. They are all local mines, working from five to thirty miners, and depend on wagon trade, a great deal of which comes from Davenport and Buffalo. They also have considerable farming trade. Coal is sold at the mines in this county at from $1.50 to $1.75 per ton. The coal is screened below in the mine, and each miner pushes his coal to the bottom of the shaft or slope and cages it himself—just the same way as all the miners did who mined coal in Iowa in years gone by.

The larger mines are those of James & Son, located three-fourths of a mile west of Jamestown; McKin & McKin, located at Jamestown; Penn Coal company, located one-half mile south of Jamestown; Theodore Couch, located one mile north of Buffalo, and Thomas Webster, located one and one-half miles north of Buffalo.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
McKin & McKin	James McKin	Jamestown	Shaft	Room and pillar.	Furnace	Steam	Local.
Williams Coal company	Geo. Hoyt	Jamestown	Shaft	Room and pillar.	Furnace	Steam	Local.
Penn Coal company	Ed. McCullough	Jamestown	Shaft	Room and pillar.	Furnace	Horse	Local.
Clipper Mine	Lewis Long	Jamestown	Shaft	Room and pillar.	Furnace	Horse	Local.
Theodore Couch	Theodore Couch	Buffalo	Shaft	Room and pillar.	Furnace	Horse	Local.
Big Star Coal company	William Fridley	Buffalo	Shaft	Room and pillar.	Furnace	Horse	Local.
James & Son	Samuel James	Jamestown	Shaft	Room and pillar.	Furnace	Steam	Local.

VAN BUREN COUNTY.

Van Buren county is in the southeast corner and in the southern tier of counties. The Des Moines river runs diagonally through the county, and near it most of the mines are located. There are four or five within a radius of three miles of Doud's station, also several local mines near Farmington. There are several other local mines in different parts of the county that are operated during cold weather.

There has been some prospecting done in Lee county, and one or two local mines opened up within the past year.

VAN BUREN COUNTY—CONTINUED.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Farmington Coal company	James Slee	Farmington	Shaft	Room and pillar	Furnace	Horse	Local.
James Turner	James Turner	Farmington	Shaft.	Room and pillar.	Furnace	Horse	Local.
David Cox	David Cox	Hillsboro	Shaft	Room and pillar.	Furnace	Horse	Local.
Findley Bros	George Findley	Douds	Shaft	Room and pillar	Furnace	Horse	Shipping.
W. R. Carson	W R. Carson	Douds	Shaft	Room and pillar.	Furnace	Horse	Shipping.

IMPROVEMENTS MADE IN THE MINES OF DISTRICT No. 2 FROM JUNE 30, 1895 TO JUNE 30, 1897.

JASPER COUNTY.

NAME OF MINE.	Air shaft	Second opening.	Stairways.	Cover on cages.	Safety catches.	Safety gates.	Furnace.	Fan.
Jasper County Coal company	1	1	..	1	1	1	....	1
Snooks Coal company	....	....	....	....	....	....	1	....
William White	1	1	....	...	....	....	1	....
Robert Carson	1	...	...	....	....	....	1	....
Total	3	2		1	1	1	3	1
KEOKUK COUNTY.								
Cressent Coal company	1	1	1	1	1	1	....	1
Pioneer Coal company	1	1	1	1	1	1	....	1
Toward Bros	1	1	1	1	1	1	....	1
Thomas Bros	1	1	....	....	....	....	1	....
William Blatt	1	1	....	1		1	1	....
Total	5	5	3	4	3	4	2	3
MAHASKA COUNTY.								
American Coal company	1	1	1	1	1	1	....	1
Oskaloosa Coal company	1	1	....		....	....	....	1
Consolidation Coal company	1	1	1	1	1	1	....	1
Garfield Coal company	1	...	....	..	....	...	....	....
Whitebreast Fuel company	....	..	1	1	. .	....	....	....
Excelsior Coal company	1	....	....	...	....	....	1	....
Carbonado Coal company	1	1	....	....	..	....	....	1
M. B Foster	1	.	....	.	....	....	....	....
J. D. Guthrie	1	1	1	1	....	1	....	1
Hoover's Coal company	1	1	1	1	1	1	....	1
Total	9	6	5	5	3	4	1	6
SCOTT COUNTY.								
James & Son	1	1	1	1	1	1	1	....
McKin & McKin	1	1	...	..	1	..	1	....
Total	2	2	1	1	2	1	2	....

CASUALTIES.

The man who works below in a mine is perhaps more exposed to unforeseen and improbable dangers than a person engaged at any other kind of labor or mechanical work. Therefore, it is certainly very important to every man following such occupation, or one having charge of men underground, never to take any unnecessary chances There occurred during the past biennial period, fourteen fatal accidents. Thirteen of this number occurred below and one on top. There were two non-fatals, which afterwards proved fatal; M. C. White, a fireman, at Consolidation No. 6, who was internally injured by inhaling some of the flames while the boiler-room was on fire; J. W. Cook, who was injured by trip of coal while doing some repair work on the endless rope system, from which he afterwards died, at the North Star mine, What Cheer, Keokuk county.

TABLE No. 4.

Showing list of fatal casualties occurring in mines in District No. 2, during the biennial period ending June 30, 1897.

DATE.	NAME OF DECEASED.	CAUSE OF CASUALTY.	NAME OF COMPANY OR MINE.	WHERE LOCATED.
September 18, 1895	Olief Sanderson	Fall of slate in his room	Consolidation Coal company	Muchakinock, Mahaska county.
November 8, 1895	J. A. Brown	Suffocated by carbonic acid gas	Consolidation Coal company	Muchakinock, Mahaska county.
November 8, 1895	A. S. Swanson	Suffocated by carbonic acid gas	Consolidation Coal company	Muchakinock, Mahaska county.
November 11, 1895	August Larson	Fell down bank shaft	D. Haworth	Oskaloosa, Mahaska county.
December 10, 1895	Walter Wilson	Run over by switch engine	Oskaloosa Coal company	Beacon, Mahaska county.
January 22, 1896	T. J. Jones	Struck by coal from a shot	D. Haworth	Oskaloosa, Mahaska county.
February 18, 1896	Adolph Schoondike	Fell down shaft	Jasper County Coal company	Colfax, Jasper county.
March 23, 1896	Dennis Townsend	Shot blown through pillar	American Coal company	Evans, Mahaska county.
October 19, 1896	W. R. Lewis	Fell under car	Consolidation Coal company	Muchakinock, Mahaska county.
December 24, 1896	Wm. Middlesworth	Fall of slate in his room	American Coal company	Evans, Mahaska county.
January 22, 1897	Rolla Shoemaker	Fall of a boulder in his room	Oskaloosa Coal company	Beacon, Mahaska county.
February 27, 1897	Wm Hendrix	Fall of slate in entry	Pioneer Coal company	Thornburg, Keokuk county.
May 6, 1897	Robert Spence	Fall of slate while drawing pillar	Jasper County Coal company	Colfax, Jasper county.
June 12, 1897	John W. Hollis	Fall of slate in his room	Carbonado Coal company	Carbonado, Mahaska county.

TABLE No. 5.

Showing list of non-fatal casualties of the Second Mining District, for the biennial period ending June 30, 1897.

DATE.	NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
July 11, 1895	Elmer Deen	Driver	Two ribs broken	Thrown from his car	Pekay.
August 8, 1895	Alfred Isaacson	Miner	Leg broken	Caught bet. car and bumpers	Muchakinock.
August 10, 1895	Chas Padgent	Miner	Seriously burned	Exploded a keg of powder.	Muchakinock.
August 20, 1895	Smith McKay	Box car loader	Arm injured.	Squeezed bet. door & apron.	What Cheer.
September 9, 1895	Sol. Muck	Miner	Right hand injured	Caught bet car and prop	Pekay.
September 17, 1895	Chas Johnson	Miner	Back badly hurt	Fall of slate	Carbonado.
September 27, 1895	Elisha Brown	Miner	Leg broken	Firing a shot	Pekay.
October 4, 1895	Mike McGraw	Miner	Two ribs broken	Fall of slate	What Cheer.

October 22, 1895	R. J. Brown	Miner	Rib fractured	Explosion of shot	Muchakinock
October 24, 1895	George Parker	Miner	Back injured	Fall of slate	What Cheer.
November 1, 1895	Benjamin Crandall	Miner	Three ribs broken	Fall of slate	Beacon.
November 7, 1895	John Brown	Miner	Leg broken	Fall of coal	Beacon.
November 20, 1895	John Johnson	Miner	Cut and bruised	Fall of rock	Beacon.
November 21, 1895	J. Warren Cook	Miner	Injured internally	Struck by a trip	What Cheer.
November 22, 1895	H. Rudd	Miner	Back injured	Fall of slate	What Cheer.
December 11, 1895	N. R. Middlesworth	Track layer	Small bone of leg broken	Fall of slate	Beacon.
December 18, 1895	Ed. Reeves (colored)	Miner	Leg broken	Fall of slate	Colon.
January 11, 1896	James Bennett	Miner	Arm broken	Firing a shot	Muchakinock
January 15, 1896	William Baird	Miner	Back injured	Caught bet. car and rib	What Cheer.
January 29, 1896	Charles Blanquert	Miner	Spine dislocated	Fall of slate	What Cheer.
January 29, 1896	James Burnett	Miner	Head and face cut	Fall of coal	Colon.
March 4, 1896	Charles Johnson	Miner	Ankle sprained	Fall of shoddy	What Cheer.
May 15, 1896	Joe Fothergill	Driver	Cut about head	Fall of slate	Lost Creek.
August 21, 1896	Hal Buford (colored)	Miner	Leg broken	Fall of slate	Colon.
September 4, 1896	John Caulberg	Miner	Back broken and three ribs fractured	Fall of slate	Muchakinock.
October 8, 1896	I. Nelson	Miner	Injured about head	Struck against rib	Lost Creek.
October 12, 1896	John Swalf	Miner	Back injured	Fall of slate	Carbonado.
October 15, 1896	R. Crooks	Miner	Burned	Powder from shot	Lost Creek.
October 15, 1896	F. Hilton	Miner	Burned	Powder from shot	Lost Creek.
October 26, 1896	John Brown	Miner	Small bone of leg broken	Fall of slate	Beacon.
November 11, 1896	Bert Long	Miner	Spinal chord injured	Fall of slate	Colon.
November 22, 1896	M. C. White	Miner			Muchakinock.
December 2, 1896	Harry Barbour	Fireman	Rib broken	Fall of slate	Beacon.
December 7, 1896	William Richards	Pit dayman	Three bones in foot broken	Fall of slate	Beacon.
December 7, 1896	Andrew Berger	Miner	Internal injuries	Fall of coal	What Cheer.
Debember 28, 1896	Wm. King (colored)	Miner	Right leg broken	Fall of coal	Lost Creek.
January 4, 1897	Joseph Powal	Miner	Spine injured	Fall of slate	Beacon.
February 4, 1897	C. S. Stone	Miner	Arm broken	Fall of coal	Lost Creek.
March 12, 1897	John Dunning	Miner	Collar bone and shoulder blade broken.	Fall of coal	Carbonado.
March 13, 1897	David Sheldon	Miner	Head severely bruised	Fall of rock	Evans.
March 13, 1897	C. E. Anderson	Miner	Right leg broken	Fall of coal	Pekay.
April 6, 1897	R Thomas	Miner	Shot in eye	Firing a shot	Colon.
May 2, 1897	Jacob Jones	Track layer	Left arm broken	Fall of slate	Carbonado.
May 2, 1897	William Hall	Track layer	Back injured and two ribs broken	Fall of slate	Carbonado.
May 29, 1897	J. W. Bricker	Driver	Right leg broken	Fell off tail chain	Pekay.
June 23, 1897	Mike Bokoss	Miner	Thigh broken	Fall of slate	Lost Creek.

LIST OF FATAL ACCIDENTS.

On November 8, 1895, James Brown and A. S. Swanson were found dead in the entrance to room No. 3 on ninth D entry in the Consolidation Coal company's mine No. 6, Mahaska county. A. S. Swanson was working in No. 3 room two months previous to this accident. While so doing Mr. Swanson drove through into some old workings where fire existed. Therefore, in order to protect the workings on the ninth D entry, No. 3 room was bratticed up to prevent any air going in the room or damps coming out on the entry. Mr. Swanson discovered, after the room was bratticed up, that he had left part of his tools in the room. He went to work, however, in another part of the mine, and did not try to get them then. About two months afterward, on November 7th, during the day he arranged with Mr. James Brown, who was brattice man, and had in his charge the keeping air-tight of all the stoppings in the mine, to go with him to room No. 3 on ninth D entry, open the stopping in that room, and help him get his tools out. Mr. Brown spoke to the mine foreman, Daniel Reece, about opening this stopping and Mr. Reece told Mr. Brown not to open the stopping for the reason the room would be full of damps and dangerous to go into. Mr. Brown and Mr. Swanson on the evening of November 7th, after the men had quit working in that section of the mine, went over to said room and cut a hole in the stopping large enough to crawl through. Mr. Brown was found next morning about 7 o'clock inside of the stopping, with a cord tied around his body, the other end of the cord in Mr. Swanson's hand, who was on the outside of the stopping, with his head in the opening they had cut in the brattice. Mr. Brown, knowing he could not carry a light, tied this cord around his waist so that Mr. Swanson could guide him back to this opening after he had secured the tools. But he was overcome with damps in that room before he was aware of it. And Mr. Swanson, in the act of trying to get Mr. Brown out, was also overcome, for the damps were coming out through the opening they had cut. After a careful examination of the mine and due consideration given all the evidence relating the accident, I find that the unfortunate men who lost their lives by this accident were alone to blame. Their safety in this instance was sacrificed by their own acts in taking risks which were not only rash, but contrary to their own instructions, their duty, and practical mining.

The coroner's verdict was: "That the deceased came to their death from breathing black damp, the same being caused by their own carelessness."

November 11, 1895, at 9:15 A. M., Augustus Larson was killed while acting as weighman and dumper at Howarth coal mine, Mahaska county. Deceased was a single man, 25 years of age. His usual work consisted of screening coal, etc. On the morning of the 11th the regular weighman did not come to work; the top foreman sent Mr. Larson up to do the weighing and dumping at 7 A. M. He continued until 9:15 when, in pulling an empty car back to the cage, he instead pulled it into the open shaft, stepping into the shaft and pulling the car with him. From the evidence given at the inquest the gates were working all right up until this time, but for the want of oil had become dry and did not follow the cage down to this landing, as he could not have stepped into the shaft if the gates had come down.

During the day, December 10, 1895, Walter Wilson, a top employe working in the capacity of car trimmer for the Oskaloosa Coal company, of Mahaska county, at mine No 4, was killed by a switch train while putting empties above the chute. In the act of jumping on the cars he evidently slipped and fell between them; five cars passed over him before the train of empties was stopped. The coroner's verdict was carelessness on the part of the deceased, he having in no way anything to do with the cars while the engine crew was putting them above the chute.

T. J. Jones, a miner employed at Howarth coal mine in Mahaska county, was killed January 22, 1896, by a shot blowing through a pillar of coal while Mr. Jones and his brother were going by. I found, on examining this pillar, that it was about eight to ten feet thick. This pillar of coal was between the back west entry and a room running parallel to the entry. The coal was six to seven feet thick and a free coal; the shot being drilled from the room was gripping and blew the coal the reverse of what was expected it would do The coroner's verdict was that deceased was killed by coal from said shot.

Adolph Schoondick, on the evening of February 17, 1896, at 6:10 o'clock, met his death by falling down the Jasper County Coal company's mine in Jasper county. Mr. Schoondick was working on the night shift in the mine with Eli Cross. He left Mr. Cross in the engine room, where he was putting a wick in his lamp, and went up to the tipple on top in the dump house to get on the cage in order to go down the shaft. From the evidence given at the inquest, the deceased had no light, and in the act of opening the swinging gate, leading, he supposed, to the cage, must have opened the wrong gate and stepped into the shaft, falling on top of the cage below at the bottom of the shaft, a distance of 128 feet, where he was found by his partner, Eli Cross. The coroner's verdict was accidental death.

A fatal accident happened to Dennis Townsend, a miner mining coal in Mahaska county for the American Coal company in mine No. 2, on March 23, 1896, between the hours of 12 and 1. The deceased was killed by a shot of coal blown from a pillar between his room and the one going parallel with his room. A break was being made through the pillar. According to the evidence given at the inquest, Mr. Townsend had fired a shot on that rib to help make the break through, leaving the shot drilled in the same pillar from the other side too weak to do its intended work, consequently it blew the coal into Mr. Townsend's room, killing him instantly. The coroner's verdict was that the company was in no way to blame.

On September 18, 1896, in the Consolidation Coal company's mine No 6, Makaska county, Oleif Sanderson, a miner, was instantly killed by a piece of slate falling from the roof at the face of his room, No. 3, on east parallel entry. Upon examination I found Mr. Sanderson's room well timbered, with the exception of this piece of slate, which was six feet long and four feet wide, coming from a slip in the roof. It had evidently been cracked from the top down by putting a prop tight under it, owing to the heavy part of the slate projecting over the road where he was working. Mr. Sanderson had timber in the room, but, no doubt, thought the room was safe. The coroner's verdict was "accidental death."

W. R. Lewis, employed as a driver, was killed in the Consolidation Coal company's mine No. 8 on the morning of October 19, 1896, while pulling a two car trip down the first grade on the east side to the parting at the bottom of the shaft. After a careful and painstaking examination of the track and grade over which Mr. Lewis pulled coal, I think the unfortunate man must have slipped and fallen between the car and the mule on the track, the car passing over his body. The coroner's verdict attached no fault to any one, the same being an unavoidable accident.

William Middlesworth, a miner in the employ of the American Coal company at mine No. 2, was killed on December 24, 1896, at 3 o'clock in the afternoon in room No. 3 on N entry. The deceased was loading a car of coal at the face of his room when a piece of slate fell from the roof, pinning him down on the edge of the car and killing him instantly. His partner, Mr. Pratt, not being at work that day, he was working alone and was not found until the driver, Edgar West, went into his room for his car. The deceased was a single man. I noticed, while examining this room after the accident, that two slips met each other at the point where this slate fell from. There had been a plank under this piece of slate and a prop under the plank four feet from the end of the plank, which plank was broken off at the prop. The coroner's verdict was "unavoidable accident caused by fall of slate."

Rolla Shoemake, a timber man in the employ of the Oskaloosa Coal company at mine No. 2, was killed about 8 A. M., January 8, 1897. The deceased and another day man were sent into a room to remove some slate and secure some that was loose. There was a boulder on the right hand rib of their room three or four feet in diameter, which could not conveniently be timbered so as to take it down easily. Mr. Shoemake, therefore, began fixing a place to let it fall in out of the way of the track, which was not far from the rib. While in the act of removing the material from under the boulder it fell, catching him partially under it, and injured him so that he died within two hours. The deceased knew this boulder was loose, and was trying to keep himself safe in case it fell before he was ready for it. A prop under it would have made it safe to work under, but, like nine men out of ten, Mr. Shoemake was in a hurry, and did not take the time to put one up. The coroner's verdict was accidental death.

William Hendrix, a miner, was killed at 9 A. M., February 27, 1897, in the Pioneer Coal company's mine, which is located three miles northeast of What Cheer. This mine is in the hands of a receiver, Mr. Holderman, of Thornburg, Keokuk county. Mr. Hendrix was driving entry. He was, when killed, in the act of lifting a prop out of a car on his entry fifty-five feet back from the face of the entry, when a piece of roof fell, eight feet long, six feet wide, and three to six inches thick, crushing him against the edge of the car and killing him instantly. When I arrived and examined this entry I found it timbered up in good shape, but could plainly see where the slate fell from. On questioning some of the men working near this place I found they considered it unsafe previous to the accident. The coroner's jury gave the following verdict: "We do find the deceased came to his death by a fall of slate in the Pioneer Coal company's works in said county, the same being accidental."

In the Jasper County Coal company's mine, three miles north of Colfax, Robert Spence was killed at 2 o'clock on May 6, 1897. Deceased was working with Albert Trevethan, drawing a pillar. They did not consider the roof dangerous. There were props under the piece of slate. The piece of slate swung the timbers under it, and falling on Mr. Spence buried him completely, killing him instantly. The coroner's verdict was that deceased came to his death from having his skull crushed by accidental fall of slate.

John Hollis, a miner employed at Battle Creek slope, owned by the Carbonado Mining company, was killed at 11 o'clock on June 12, 1897, by a fall of slate from the roof in his room. The coroner's verdict was that deceased came to his death by roof falling on him, and that no one was to blame.

THE QUESTIONS OF LAST EXAMINATION.

RULES AND REGULATIONS GOVERNING THE EXAMINATION OF CANDIDATES FOR THE OFFICE OF STATE MINE INSPECTOR OF IOWA.

10 A. M., APRIL 21, 1896.

1. Each candidate, before entering upon the examination, will register with the secretary of the board of examiners, his name, age, residence, citizenship, experience in coal mining in Iowa, and whether or not he has been acting as agent or superintendent of any mine for at least six months prior to his appearance for examination.

2. The written examination will consist of twenty-eight questions, and will be given in four sections, the board holding two sessions daily, of three hours each. All the questions given for any one session must be answered during that session, and in no case will answers be received to questions given at a previous session.

3. The candidates will be called for the oral examination in the order of the number on their cards. The oral examination of each candidate will be made separately, and he will be required to answer before the board such questions as may be propounded to him.

4. Each candidate will be assigned to a separate desk, and be furnished with writing material and a printed list of questions to be answered in writing; each answer must be numbered to correspond with the number of the printed question.

5. Write your name upon the numbered card furnished you, inclose the same in the envelop and seal it, but write nothing on the envelop. Put the number of your card upon the top of each sheet of your examination paper.

6. Each candidate must interpret the meaning of the written questions according to his own judgment. No information of this kind will be given by the board.

7. No one will be permitted to use, or to have in his possession, any notes or memoranda, or books of any kind, as aids in answering the questions during the examination, and anyone desiring to leave the room must first obtain permission from the board, and before retiring surrender his examination papers to the secretary.

8. Questions not answered will count zero.

9. All candidates whose examination (written and oral) shall show an average of 80 per cent, and who shall have met the requirements of the law in other respects, will receive from the board of examiners a certificate of competency, enabling them to stand before the governor as candidates for the office of state mine inspector.

10. No applicant for examination will be registered or received after the date and hour above given.

FLOYD DAVIS,
Secretary.

WRITTEN EXAMINATION (FIRST SESSION).

1. Enumerate the most essential parts of our mining laws which pertain to the health and safety of the workmen employed in the mines.

2. What weight of coal will an average horse lift out of a shaft 100 feet deep, if the diameter of gin drum is four feet and that of the track twenty-four feet, the horse having a traction of 120 pounds? And what would be the time of winding, the horse traveling at the rate of two and one-half miles per hour?

3. What is ventilation, and why is it required in coal mines?

4. If the length of the air-ways of a mine were doubled, other conditions remaining the same, in what proportion would you have to increase the ventilating pressure to produce the same volume of air?

5. How much does the atmospheric pressure vary by a difference of one inch in the reading of the barometer?

6. How much more resistance does an air current encounter when traveling at 600 feet per minute than at 500 feet per minute, size of air-ways being the same? If the water-gauge is .76 of an inch at the lower speed, what will it be at the higher?

7. What gases are met with in the mines of this state, and which are the most frequent?

8. In the absence of carbureted hydrogen gas, why should we have explosions in our mines?

WRITTEN EXAMINATION (SECOND SESSION).

9. What are the advantages and disadvantages of the long wall and the room and pillar systems of working coal mines?

10. Which system, long wall or room and pillar, has the greatest per cent of accidents to life? Explain fully.

11. Given two air-ways, each 400 feet long, and having passed through them under constant pressure 9,000 cubic feet of air per minute. If one of them be shortened to 100 feet and the other increased to 1,600 feet, how much air will pass through each?

12. What is the total ventilating pressure on an air-way 6x7 feet, the water-gauge being .5 of an inch?

13. Given 10,000 cubic feet of air per minute through an air-way 10x8 feet, with a pressure of ten pounds per square foot, what is the length of the air-way?

14. Describe black damp and give its characteristics, how produced, detected, etc.

15. Find the motive column when the temperature of air in the downcast is 40 degrees Fahrenheit, and that of the air in the upcast 78 degrees Fahrenheit, the depth of shaft being 1,000 feet.

16. If 9,000 cubic feet of air per minute will circulate through a regulator 30x20 inches, how much will pass through another regulator 30x30 inches, under the same pressure?

WRITTEN EXAMINATION (THIRD SESSION).

17. Describe white damp, and give its characteristics, how produced, detected, etc.

18. What are the principles involved in obtaining the constant number 5.2 in connection with the water-guage?

19. The length of the arm of the safety-gauge of a boiler is thirty-two inches, and the distance between the valve and fulcrum is four inches. The diameter of the valve is 2.5 inches, and the weight at the end of the lever is 30⅝ pounds. To what pressure per square inch will the boiler be subjected before the safety valve will be opened?

20. If the indicated horse-power of an engine operating a fan be forty, and the horse-power of the air be twenty-eight, what is the percentage of useful effect?

21. If 100,000 cubic feet of air pass per minute through an air-way with a two-inch water-gauge, what are the units of work producing the ventilation?

22. What horse-power will an engine exert when yielding 60 per cent of duty to move 100,000 cubic feet of air per minute, the water-gauge standing at one inch?

23. If the water-gauge stands 1.02 inches when the ventilating fan revolves sixty-five times per minute, what will be its reading when the speed of the fan is increased to ninety-six revolutions per minute?

24. Show by a sketch a set of timbers to resist both top and side pressure.

WRITTEN EXAMINATION (FOURTH SESSION).

25. What is the safe working load and breaking strain of a 1¼-inch steel wire rope?

26. The entry of a certain mine runs north forty-five degrees west. It is desired to measure a portion of this, but it is obstructed with water. It is found, however, that by starting at a certain point in the entry which we will call A, and running sixty yards west, thence twelve yards north, thence forty yards east, the said entry is again reached at a point we will call B. What is the distance from A to B?

27. A mine is ventilated by three splits of air, A, B and C; A taking 2,500 cubic feet per minute, B 1,500 cubic feet per minute, and C 2,000 cubic

feet per minute, out of a total of 6,000 cubic feet. What will each split take if the total ventilation be increased to 75,000 cubic feet per minute?

28. Draw a plan of an ideal mine capable of producing 300 tons of coal per day, showing the system of ventilating doors, stoppings, etc.

ORAL EXAMINATION.

1. What are the principal indications that would warrant one in drilling for coal?
2. What is meant by the term bituminous coal?
3. What are the principal detrimental compounds found in Iowa coal?
4. What are the causes of gob fires?
5. What are the essentials of a well ventilated mine?
6. What are the chief points to be noticed in the inspection of a coal mine?
7. In opening a mine on the room and pillar plan, what size pillars should be left?
8. What are the three most important points to be considered in laying out a new mine?
9. What are the advantages of using a transit over a compass in making a survey of a mine?
10. What instruments are necessary to measure the ventilation of a mine and how is the quantity of air in it ascertained?
11. How can the number of doors in a coal mine be reduced?
12. What method would you adopt to obtain a large amount of air with a low water-gauge?
13. How much has the ventilating power to be increased to treble the quantity of air in a mine?
14. What effect will a contraction of an air-passage have upon the water-gauge and the quantity of air that passes through it?
15. In driving a single entry with brattice, should the narrow or the wide side be the intake?
16. Is iron or steel the best material for hoisting ropes? Why?
17. Is the use of mining machines operated by compressed air beneficial or detrimental to the ventilation of a mine?

BIENNIAL REPORT

OF THE

THIRD DISTRICT,

EMBRACING

Adair, Boone, Dallas, Greene, Guthrie, Marion, Polk, Story
and Webster Counties.

MORGAN G. THOMAS, INSPECTOR.

REPORT.

Hon. F. M. Drake, Governor of Iowa:

SIR—In compliance with the requirements of the mining law of the state, defining the duties of state inspectors of mines, I herewith submit the report of the Third district for the biennial period ending June 30, 1897. Very respectfully,

MORGAN G. THOMAS,
Mine Inspector Third District

INTRODUCTION.

This report contains the annual and biennial compilation of statistics of this district for the two years, including the prominent features pertaining to the business during that period, and also embodying some propositions or opinions formed from a personal knowledge and a careful study of the situation relative to the condition of the mining industry which, I believe, if practically conformed with, would demonstrate the fact that they would be promotive of, and the means of producing, good results. Although there have been no strikes nor anything that was menacing to the trade arising from any friction or disagreements between operators and miners that were of any consequence, still the business is in a very unsatisfactory state at the present time on account of low prices and an inadequate demand for the amount of coal that could and should be produced if the trade were in a normal condition

Close competition in our home markets is largely responsible for the former, while the general stagnation of business, inactivity of capital, and the uncertain prospects of the commercial future will reasonably account for the latter This inanimation and lifelessness of the trade has unavoidably made competition so close between operators that prices have been sliding down until they have reached a point where they cease to be remunerative to either operator or miner, as the cost of production is about what it is selling for in the market.

There has been an increase in the output in this district of about 300,000 tons, bringing the total up to something over 2,000,000 tons for the last biennial period, but with the same number of men employed as at present, and with a market that would require the operating of the mines 300 days in a year to supply the demand, they could produce three times as much coal as is produced under the present mode of operating. The mines have the capacity, and the coal, and the work would be of great advantage to the miner. The main thing, and the only thing lacking, is an appreciable and reliable market. A proposition that I believe would be expedient and ultimately successful is for the mining districts to encourage and co-operate in building factories of various kinds that are adapted to the natural resources of their territory, creating a home market for the consumption of the coal, and lifting the depressing burden of hard times, caused by the slackness of work, from the shoulders of the miners.

Under present conditions there is an over-supply of labor in the mining camps, and it grows worse instead of better as the miners and laborers are increasing in number each year, while the annual output of coal has varied very little in the last ten years; and unless there can be new life instilled into the industry, and the business built up until it would insure employment to this surplus idle labor, I believe it advisable that a part of them at least should seek other vocations in life, especially the younger element. There is no doubt that they would do as well, and perhaps better, and it would also alleviate the congestion of the labor market in and around the mines.

Despite the adverse circumstances that the trade has had to contend with in the last two years, and the unflattering outlook for the business, there have been nine new railroad mines opened up since my last report, operators basing their hopes of success presumably on the grounds of a probable return to more prosperous times. With only three mines worked out and abandoned, it leaves a gain of six railroad mines for the biennial period.

The law enacted by the Twenty-sixth General Assembly to prohibit the sale of impure oil for use in the mines has been very satisfactory in its results. The only difficulty we have to contend with in regard to it is there are so many firms that manufacture cheap impure oil that there are few brands that come up to the required standard, making pure oil in the market a rarity. In my frequent visits to the mines of this district, I have been fortunate in finding them generally in good, clean, workable order. My complaints are few in reference to any neglect of operators in keeping their mines within the confines of the law, and when my official duty made it necessary to call their attention to any defects there was an accepted willingness on their part to make the improvements that I believed essential for the betterment of the sanitary or safety condition of the mines. I feel grateful to both miners and operators for their kind and mutual assistance, and their hearty co-operation relative to keeping the mines in first-class shape, also for the contribution of material that was necessary for the compilation of this report. This has made the work less burdensome, more expeditious, and very gratifying.

TABLE No. 1.

Showing number of mines, annual output, number of miners employed, value of product, etc., in District No. 3 for the year ending June 30, 1896.

NAME OF COUNTY.	Number of mines.	Number of tons of coal produced.	Average price per ton for mining.	Number of miners employed.	Number of other employes.	Total amount paid miners.	Total amount paid all other employes.	Total value of product at mines.	Average selling price per ton at mines.	Expense of props, tracking, etc., at mines.
Adair........	1	1,600	$1.00	8	2	$ 1,600	$ 600	$ 3,840	$2.40	$ 1,640
Boone...	20	286,763	.83	610	234	238,013	52,120	510,432	1.78	46,200
Dallas......... ...	3	18,701	.85	53	12	15.895	2,800	29,173	1.56	4,600
Greene...........	5	10,328	.78	62	26	8,055	3,840	13,942	1.35	1,020
Guthrie..........	11	10,840	1.20	88	10	13,008	3.436	16,260	1 50	800
Marion...........	17	198,554	.67	267	105	133,031	46.220	228,337	1.15	7,546
Polk	25	415,695	.74	982	384	307.613	135,871	540,406	1.30	42,640
Story............	1	10.340	1 00	24	8	10.340	3,446	16,027	1.55	1,200
Webster..........	16	106,201	.78	886	116	82,836	38,432	137,061	1.30	6,540
Total.	99	1,059,022	$ .76	2479	897	$810,391	$286,735	$1495,478	$1.41	$112,186

TABLE No. 2.

Showing number of mines, annual output, number of miners employed, value of product, etc., in District No. 3 for the year ending June 30, 1897.

NAME OF COUNTY.	Number of mines.	Number of tons of coal produced.	Average price per ton for mining.	Number of miners employed.	Number of other employes.	Total amount paid miners.	Total amount paid all other employes.	Total value of product at mines.	Average selling price per ton at mines.	Expense of props, tracking, etc., at mines.
Adair.............	1	2,500	$1.10	9	3	$ 2,750	$ 900	$ 5,000	$2 00	$ 1,900
Boone............	22	329.285	.83	795	247	273.307	98,240	533,440	1.62	92,500
Dallas...........	3	16,781	.84	52	10	14.096	3,000	25,843	1.54	3,940
Greene..........	5	17,085	.85	70	18	14,522	6.300	28,703	1 68	4,500
Guthrie..........	13	11,340	1 20	78	23	13.608	7,050	25,514	2.25	3,131
Marion.....	18	138,019	.66	253	79	91,093	17,340	120,217	.90	6,740
Polk..............	26	572,895	.76	1151	402	435,460	168,800	756,221	1.32	53,640
Story.............	1	12.240	.85	27	10	10,404	4,140	18,972	1 55	2,400
Webster..........	17	101,643	.78	402	120	79.262	44,400	134,169	1.32	5,760
Total.	106	1,201.788	$ 78	2837	912	$934,443	$350,170	$1648,079	$1 37	$174,511

NOTE—The above tables do not contain the salaries of superintendents, mine foremen or other officials of the mines; neither do they contain the royalty that the different companies pay on coal, which is from eight to eighteen cents per ton.

TABLE No. 3.

Showing coal output of counties comprising District No. 3, for the past five years, in tons.

COUNTIES.	1893.	1894.	1895.	1896.	1897.
Adair	.....	2,500	2,642	1.600	2,500
Boone	185.916	189,000	191.972	286,763	329,285
Dallas	36,188	17,500	16,503	18,701	16,781
Greene	49,543	14,000	38,296	10,328	17,085
Guthrie	14,000	12,340	11,240	10,840	11.340
Marion	233,528	172,847	150,361	198,554	188,019
Polk	466,408	355,000	334,881	415,695	572,895
Story	....	....	4,620	10,340	101,643
Webster	145,274	153,247	103,439	106,201	12,240
Total	1,130,857	916.434	853,954	1,059,022	1,201,788

LOCATION AND SHIPPING FACILITIES OF MINES IN THIRD DISTRICT.

There are 103 mines in the Third district subject to the inspection laws. Sixty-two are shipping mines and forty-one local. The shipping mines are those located on a line of railroad, and sell the bulk of their production to the railroads direct, or ship it by rail to markets outside their immediate territory. The mines that are not accessible to railroad transportation and are dependent upon a limited market, or are compelled to sell their coal at the mine for domestic use or other purposes, or transport it by horse or mule power in wagons, are classed in the inspector's report as local. The material object in this part of my report is to make as reliable a record as possible relative to the mines of this district, especially the shipping mines, their facilities and advantages in the way of transportation. The following will show where they are located and on what line of road.

There are thirteen on the Chicago, Rock Island & Pacific; ten on a branch of the Chicago, Burlington & Quincy; fourteen on the Chicago & North-Western; three on the Chicago Great Western; one the Chicago, Milwaukee & St. Paul; nine on the Mason City & Ft. Dodge; eight on the Minneapolis and St. Louis, and four on the Wabash. The majority of these mines load almost their entire output direct from the mine to railroad cars on track ready for shipping. Six counties have railroad mines: Boone, Dallas, Greene, Marion, Polk and Webster.

Boone county has twelve shipping mines; nine are located west of Boonesboro on a branch of the Chicago & Northwestern railway, owned and operated by the following companies: W. D. Johnson Coal Mining company, Milford Coal Mining company, Crow & Marshall Coal Mining company, Clyde Coal Mining company, Zimbelman Coal Mining company, Carpenter Coal Mining company, Riverside Coal Mining company and Garden Hill Coal Mining company. At Frasier, in the northern part of the county on a branch of the

Minneapolis & St. Louis railway, the Boone Valley Coal and Railroad company's mines No. 1, No. 2 and No. 3 are located. The local mines are situated in nearly all parts of the county from Madrid in the south to Pilot Mount north, and from Zenorsville in the east to Ogden west.

Dallas county has only two shipping mines at the present time. The Van Meter Coal Mining company's mines are located at Van Meter on the Chicago, Rock Island & Pacific railway. The Dawson Coal Mining company's mine on the Chicago, Milwaukee & St. Paul, at Dawson, is the only mine of any note located on this line of road in this district. There are several other mines in the county, but their trade is merely local.

In Greene county, the Angus Coal company's mine is the largest and practically the only shipping mine in the county. The coal is shipped over the Chicago, Rock Island & Pacific railway, from Angus, where the mine is located, to different points over that road. They employ about seventy men the year around. The several local mines in this county do quite a lucrative business during the fall and winter, necessitating the employment of from ten to twenty men to the mine during the local trade season.

The Guthrie county mines are all purely local, situated promiscuously over the county. The coal is of a very good quality and meets with a ready market during the fall and winter months, when the demand is such that operators enjoy a short season of prosperity in that line and give steady work to from six to fifty men to the mine during the time they are operated.

Marion county has about twenty mines located within its borders that come under the laws of inspection. They are about evenly divided as to number between local and shipping. Some of them do both a local and a shipping trade especially in the vicinity of Hamilton, where there are six or eight local mines that ship considerable coal during the year. Outside of these there is quite a number of local mines scattered over the county working from five to twenty miners during the fall and winter. The majority of the mines that do almost an exclusive shipping business are located on a branch of the Chicago, Burlington & Quincy railway that runs from Albia to Des Moines. The Black Swan Coal Mining company, at Swan; the Hawkeye Coal Mining company, and the Rawlings mine, at Flagler; and the Bussey Coal Mining company, at Bussey, are the main shipping mines on this line of road. At Dunreath the Success Coal Mining company is located. It ships the principal part of its output via the Wabash railway. The Otley mines, at Otley, get transportation over the Keokuk and Des Moines division of the Chicago, Rock Island & Pacific railway.

Polk county has eleven large and well equipped shipping mines located on the different lines of railroad that lead to the city of Des Moines. These eleven mines sell the bulk of their coal to railroad companies, or ship it by rail to other markets. Six of these shipping mines: The J. M. Christy Coal Mining company, the Carbondale Coal company's No. 1 and No. 2 mines, the Gibson mines, the Van Ginkel mine, and the Manbeck mines—are on the Chicago, Rock Island & Pacific railway. The Des Moines and Eureka Coal Mining companies' mines are on the Chicago & North-Western road, the Maple Grove and Western Coal Mining companies are on the Chicago Great Western railway, the Acme Coal company's mines are located at Runnells, on the Wabash railway. There are also fourteen local mines, making in all twenty-five mines in the county. The local mines employ from ten to sixty miners each. The principal part of their output is sold at the mine or transported by wagon to different parts of the county and into the city of Des Moines, and sold to the factories and shops and for domestic uses.

Webster county has thirteen shipping mines. The Crooked Creek Coal & Railway company operates several mines at Lehigh and also owns a short line of railroad connecting Lehigh with Webster City, over which it ships the most of its product, loading the cars direct from the mines. The Webster County Coal & Land company's mines and the Corey mines, at Lehigh; the Pleasant Valley mines, Collins Brothers' mines, and the McClure mines at Coalville; are all on a branch of the Mason City & Ft. Dodge railway. The Craig Coal Mining company's mines are located at Kalo on the Minneapolis & St. Louis railway. There are several other mines in the county that employ from five to ten men each that rely solely on the local trade for the disposition of the product, as they have no railroad connection. Consequently they are not in operation except during the fall and winter.

BOONE COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
W. D. Johnson Coal and Mining company	W. D. Morgan	Boonsboro	Shaft	Long wall	Fan	Steam	Shipping.
Milford Coal and Mining company	John Keating	Boonsboro	Shaft	Long wall	Fan	Steam	Shipping.
Crow & Marshall Coal and Mining company	John Marshall	Boonsboro	Shaft	Long wall	Fan	Steam	Shipping.
Clyde Coal and Mining Company	O. M. Carpenter	Boone	Shaft	Room and pillar.	Fan	Steam	Shipping.
Boone Valley Coal and Railroad company, No. 1	O. M. Carpenter	Boone	Shaft	Long wall	Fan	Steam	Shipping.
Boone Valley Coal and Railroad company, No. 2	O. M. Carpenter	Boone	Shaft	Long wall	Fan	Steam	Shipping.
Boone Valley Coal and Railroad company, No. 3	O. M. Carpenter	Boone	Shaft	Long wall	Fan	Steam	Shipping.
Zimbelman Coal and Mining company	George Zimbelman	Boonsboro	Shaft	Long wall	Fan	Steam	Shipping.
Riverside Coal and Mining company	George Rogers	Boonsboro	Shaft	Long wall	Fan	Steam	Shipping.
Carpenter Coal and Mining company	Thomas Carpenter	Boone	Shaft	Long wall	Fan	Steam	Shipping.
Garden Hill Coal and Mining company	Andrew Heaps	Boonsboro	Shaft	Long wall	Fan	Steam	Shipping.
John E. Johnson & Co.	John E. Johnson	Moingona	Shaft	Long wall	Furnace	Horse	Shipping.
White Smoke Coal company	William Blythe	Moingona	Shaft	Long wall	Furnace	Horse	Shipping.
W. D. Morgan mine	W. D. Morgan	Boonsboro	Shaft	Long wall	Furnace	Steam	Shipping.
Eagle Coal Mining company	J. B. Mallory	Boonsboro	Shaft	Long wall	Fan	Steam	Shipping.
Hutchinson Bros. & Son	John Hutchinson	Zenorsville	Shaft	Room and pillar.	Furnace	Horse	Local.
Joseph York mine	Joseph York	Zenorsville	Shaft	Room and pillar.	Furnace	Steam	Local.
James Wilson mine	James Wilson	Pilot Mound	Shaft	Room and pillar.	Furnace	Horse	Local.
John Caswell mine	John Caswell	Moingona	Shaft	Long wall	Furnace	Horse	Local.
John Benson mine	John Benson	Ogden	Shaft	Long wall	Furnace	Steam	Local.

DALLAS COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Dawson Coal and Mining company	Peter Thomas	Dawson	Shaft	Long wall	Fan	Steam	Shipping.
Van Meter Coal and Mining company	C. B. Platt	Van Meter	Shaft	Long wall	Fan	Steam	Shipping.
James Tudor mine	James Tudor	Dawson	Shaft	Long wall	Furnace	Horse	Local.

GREENE COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Angus Coal and Mining company	Samuel Sheppard	Angus	Shaft	Room and pillar.	Fan	Steam	Shipping.
Dalby Coal and Mining company	John Dalby	Angus	Shaft	Room and pillar.	Fan	Steam	Shipping.
Michael Feltch mine	Michael Feltch	Angus	Shaft	Room and pillar	Furnace	Horse	Local.
Henderson & Thrap	Henderson & Thrap	Angus	Shaft	Room and pillar	Furnace	Steam	Local.
Bennett mine	John Bennett	Angus	Shaft	Room and pillar.	Furnace	Horse	Local

GUTHRIE COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Clipper mine	A. Merchant	Fansler	Shaft	Long wall	Furnace	Horse	Local.
A. Winters mine	A. Winters	Fansler	Shaft	Long wall	Furnace	Horse	Local.
Black Diamond mine	James Thomas	Fansler	Shaft	Long wall	Furnace	Horse	Local.
Marsham mine	James Marsham	Fansler	Shaft	Long wall	Furnace	Horse	Local.
S. S. Briggs mine	S. S. Briggs	Fansler	Shaft	Long wall	Furnace	Horse	Local.
Hughes Bros.' mine	N. Hughes	Fansler	Shaft	Long wall	Furnace	Horse	Local.
Panora coal mine	D. D. Reese	Panora	Shaft	Long wall	Furnace	Horse	Local.
Green Briar mine	W. D. Simon	Jamaica	Shaft	Room and pillar.	Furnace	Steam	Local.
Charles Millen mine	Charles Millen	Bayard	Drift	Long wall	Furnace	Horse	Local.
W. P. Williams mine.	W. P. Williams	Bayard	Drift	Long wall	Furnace	Horse	Local.
Higgins. Hoops & Morris	J. Higgins	Panora	Shaft	Long wall	Furnace	Horse	Local.

MARION COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	NAME OF SUPERINTENDENT.	POSTOFFICE ADDRESS.	Kind of mine.	PLAN OF WORKING MINE.	How ventilated.	Kind of power used.	Shipping or local.
Black Swan Coal and Mining company	Thomas Beck	Swan	Shaft	Room and pillar.	Fan	Steam	Shipping.
Success Coal Mining company	George Simpson	Dunreath	Slope	Room and pillar.	Fan	Horse	Shipping.
Oak Hill Coal and Mining company	Samuel Rollings	Flagler	Slope	Room and pillar.	Furnace	Steam	Shipping.
Otley Coal and Mining company	Peter Runnells	Otley	Shaft	Room and pillar	Fan	Steam	Shipping.
Hawkeye Coal and Mining company	E. C. Smith	Oskaloosa	Shaft	Room and pillar.	Fan	Steam	Shipping.
J. A. Boudinot mine	J. A. Boudinot.	Hamilton	Shaft	Room and pillar.	Furnace	Steam	Shipping.
Clark & York mine.	Lewis Clark	Hamilton	Shaft	Room and pillar	Furnace	Steam	Shipping.
William Lewis mine	William Lewis	Knoxville	Shaft	Room and pillar.	Furnace	Steam	Local.
William Gamble mine	William Gamble	Knoxville	Shaft	Room and pillar	Furnace	Steam	Local.
Bussey mine	J. A. J. Powers	Bussey	Slope	Room and pillar	Furnace	Steam	Shipping.
Eagle mine	J. A. J. Powers	Bussey	Slope	Room and pillar.	Furnace	Horse	Shipping.
John Youser mine	John Youser	Marysville.	Slope	Room and pillar.	Furnace	Horse	Local
David Fry mine	David Fry	Marysville.	Slope	Room and pillar	Furnace	Horse	Local
Crawford & Miller mine	Crawford & Miller	Otley	Slope	Room and pillar	Furnace	Horse	Shipping.
William Franklin mine	William Franklin	Pella	Slope	Room and pillar	Furnace	Horse	Local.
Hugh McNish mine	Hugh McNish	Monroe	Slope	Room and pillar.	Furnace	Horse	Local.
Lewis Whitlatch mine	Lewis Whitlatch	Attica	Drift	Room and pillar	Furnace	Horse	Local.

POLK COUNTY.

J. M. Christy Coal and Mining company	George Grills	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Carbondale Coal and Mining company, No. 1	Thomas Knox	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Carbondale Coal and Mining company, No. 2	Thomas Knox	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Des Moines Coal and Mining company	Charles Morris	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Eureka Coal and Mining company	Charles Carlson	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Gibson Coal and Mining company	John B. Gibson	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Maple Grove Coal and Mining company	Andrew Swanson	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Van Ginkel Coal and Mining company	Lewis Getchell	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Bloomfield Coal and Mining company	John Yarn	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Proctor Coal and Mining company	William Edge	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
North Riverside Coal and Mining company	Joseph Ramsay	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Keystone Coal and Mining company, No. 1	John McKay	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Keystone Coal and Mining company, No. 2	John McKay	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Lake Forest Coal and Mining company	Edward Herdsman	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Flint Brick Coal and Mining company	Michael Quinn	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Eagle Coal and Mining company	Thomas Ray	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Oak Park Coal and Mining company	Benjamin Woods	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Manbeck Coal and Mining company	Caleb John	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Clifton Heights Coal and Mining company	J. B. Stockton	Des Moines	Slope	Room and pillar	Fan	Steam	Shipping.
Acme Coal and Mining company	J. B Fleming	Runnells	Shaft	Room and pillar	Fan	Steam	Shipping.
Western Coal and Mining company	Caleb John	Des Moines	Shaft	Room and pillar	Fan	Steam	Shipping.
Commerce mine	James Stiles	Commerce	Shaft	Long wall	Furnace	Horse	Local.
A. Merchant mine	A. Merchant	Commerce	Shaft	Long wall	Furnace	Horse	Local.
Rees Griffith mine	Rees Griffith	Commerce	Shaft	Room and pillar	Furnace	Horse	Local.
Polk City mine		Polk City	Shaft	Long wall	Fan	Steam	Local.

STORY COUNTY.

North Star Coal and Mining company	H. E. Smith	Summit	Shaft	Room and pillar	Fan	Steam	Shipping.

WEBSTER COUNTY.

Crooked Creek Coal and Mining company, No. 1	W. C. Wilson	Lehigh	Slope	Long wall	Furnace	Steam	Shipping.
Crooked Creek Coal and Mining company, No. 2	W. C. Wilson	Lehigh	Shaft	Long wall	Fan	Steam	Shipping.
Corey Coal and Mining company, No. 1	Rees Stephens	Lehigh	Slope	Long wall	Furnace	Steam	Shipping.
Corey Coal and Mining company, No. 2	Rees Stephens	Lehigh	Shaft	Long wall	Fan	Steam	Shipping.
Webster County Coal and Land company, No. 1	John Sullivan	Lehigh	Slope	Long wall	Fan	Steam	Shipping.
Webster County Coal and Land company, No. 2	John Sullivan	Lehigh	Slope	Long wall	Fan	Steam	Shipping.
Craig Coal and Mining company, No. 1	Jerry Dawson	Kalo	Slope	Long wall	Fan	Steam	Shipping.
Craig Coal and Mining company, No. 2	Jerry Dawson	Kalo	Shaft	Room and pillar	Fan	Steam	Shipping.
Pleasant Valley Coal and Mining company	Jerry Dawson	Kalo	Shaft	Room and pillar	Fan	Steam	Shipping.
Collins Brothers Coal company, No. 1	Thomas Collins	Coalville	Slope	Room and pillar	Furnace	Horse	Shipping.
Collins Brothers Coal company, No. 2	Thomas Collins	Coalville	Slope	Room and pillar	Furnace	Horse	Shipping.
Skillet Creek Coal and Mining company	William Harrison	Linburg	Shaft	Long wall	Fan	Steam	Shipping.
Irwin & Baker mine	Irwin & Baker	Kalo	Slope	Room and pillar	Furnace	Horse	Local.
Albert Stine mine	Albert Stine	Coalville	Slope	Long wall	Furnace	Horse	Local.
James Martin mine	James Martin	Coalville	Slope	Long wall	Furnace	Horse	Local.
Samuel McClure mine	Samuel McClure	Coalville	Shaft	Room and pillar	Furnace	Steam	Shipping.

SCALES TESTED.

Fifteen sets of scales have been tested as required by law, with the result that all of these were found to weigh correctly except five, which took from 100 to 150 to deflect the beam. All were at once overhauled and put in adjustment.

NEW MINES OPENED IN THE THIRD DISTRICT.

BOONE COUNTY.

Boone Valley Coal and Railroad company, No. 3.
Crow & Marshall, No. 2.
Carpenter Coal company, No. 2.

MARION COUNTY.

Hawkeye Coal Mining company.

POLK COUNTY.

Western Coal Mining company.
Eureka Coal Mining company.
Bloomfield Coal Mining Company.

WEBSTER COUNTY.

Webster County Coal and Land company, No 1.
Webster County Coal and Land company, No. 2.
McClure Coal company.

MINES ABANDONED.

BOONE COUNTY.

Carpenter Coal company, No. 1.

POLK COUNTY.

Eureka Coal Mining company.
Great Western Coal Mining company.

MINE ACCIDENTS

I have been requested by a number of the miners of my district to publish in my report the coroner's inquest on a few of the fatal accidents that occurred in the mines, so that they and the public may learn the nature and methods of these investigations. Two of such inquests will be found on the following pages.

While improvements in the nature of material and appliances for the support of the roof and sides in the roadways, and the method of using them, must tend to the diminution of accidents from falls of coal and roof, there is no question that unremitting, careful, and intelligent inspection by mine foremen, and the continual devotion of skilled labor in placing and securing reliable supports even when their necessity may seem open to question, constitute the best safeguard against accidents.

We may pass unsurmountable acts for the protection of the miner, but we shall have to teach him how to take care of himself before accidents in mines will materially decrease, especially those arising from falls of coal and roof at the face of the workings.

Inquest held on the body of Alex Bell, held before J. J. Moore, J. P., and acting coroner, on the 3d and 4th days of January, 1896:

Dan Burke on oath says: I reside at Ninth and Allen streets. I am a coal miner and work at the Lake Park mine. I was in the mine at the time Bell was killed. I heard the fall of slate. I was called to come and help take the slate off of Bell. I went to where the accident occurred and helped take the slate off of him. Bell was still alive when we took the slate off. He did not speak, but only moaned. We put him on a car. I did not know much about the condition of the room he was killed in. The condition of the rooms in this mine is about the same as other mines. The piece that fell on Bell was about six feet long and three feet wide.

DAN BURKE.

William Johnston on oath says: I reside at Lake Park and work in the Lake Park coal mine. I was in the mine when Bell was killed. I heard the fall of slate, and heard Sneddon call for help. I went to Bell's room and helped take the slate off of Bell. He was not yet dead. He never spoke, but groaned. He had his legs drawn up and his face down, and was lying sideways. I helped take him out. We took him to the office, and I remained with him until he died. Outside of the dross slate I consider this room as safe as any other. The miners are usually supposed to take the dross slate down. It usually comes down with the coal. The miner is supposed to look after the safety of his own room.

W. JOHNSTON.

Dan Shuhan on oath says; I reside at 1058 West Eighth street. Am a coal miner and work in the Lake Park coal mine. I was in the mine when Bell was killed. I heard the fall of slate. Bell had been in my room not more than ten minutes before to get a wedge to knock something down with. I did not know whether it was to knock down coal or slate. I afterwards heard him hammering. Mr. Sneddon called for help. I went as soon as I could and helped take the slate off of him. His head was down—face first. He was all covered over when I saw him. He was still alive and groaning. The other men put him on a car and took him out. I think the mine is in as good and safe shape as other mines are.

DANIEL SHUHAN.

John Sneddon on oath says: I reside at No. 1305 Capital avenue. Am a coal miner, and am one of the proprietors of the Lake Park coal mine. I was in the mine when the slate fell on Bell. I was at work at the mouth of the room. I had just been in his room and saw where he had been wedging this piece of slate—trying to get it down. I went back to my work in the entry and had worked about half an hour. I heard him commence to wedge, and then heard a fall. I called and said: "Sandy, are you on top?" He said he was. He said: "Come in and see the big chunk of coal I knocked down." I went back to his room and he had knocked down in one chunk probably a carload or more. While I was in I took the pick and sounded the slate where he had knocked the coal down. It sounded solid. After this he remarked he thought he could keep that piece of slate up by putting a few props under it. I went again to my work. I had not worked more than five minutes when I heard him halloa and heard something fall. I called for help and ran to the place where I heard the slate fall. It was about one minute before anyone else came. I tried to remove the slate and could not do so. When help enough came we took the slate off of him. We carried him out and took him up the shaft. He was not yet dead. He never spoke, and died in about half an hour. I have been mining about forty years. I would consider the room Bell was in as being safe. It is the miner's place to look after the safety of his own room, and they do their own propping.

JOHN SNEDDON.

Ed. Herdman on oath says: I reside at the Flint brickyard; work in the Lake Park coal mine, and am a coal miner by occupation. I was present at the mine when Bell was killed. I was told a man was killed or hurt in the mine. I went to the office and told the clerk to telephone for a doctor. I then went down the shaft. When I got down they had the man in a car. We took him on top and to the office. He was yet alive. He was dead when the doctor came. He died 9:30 A. M.

ED. HERDMAN.

Dr. McNaughton on oath says: I reside in Des Moines; occupation medical student. I was sent to Lake Park coal mine January 3, 1896, to see Mr. Bell, the deceased. Found him lying on the floor of the office. I made examination and found he was dead. The injuries from which he died were on the head and side of the face.

L. D. MCNAUGHTON.

STATE OF IOWA, } ss.
POLK COUNTY. }

At an inquisition holden at the city hall on the 3d and 4th days of January, 1896, before J J Moore, J P., and acting coroner of Polk county, Iowa, we the jurors on our oaths do say:

That the deceased, Alexander Bell, then and there lying dead, came to his death by being crushed and injured by falling slate while at work in the Lake Park coal mine, and from which injuries he died, and that the cause of said death was accidental and not otherwise

Sworn and subscribed to by the jury this 4th day of January, 1896.

G. T. YOUNG,
ED. CAHAL,
WM. FISHER,
Jurors.

Attest:
J J. MOORE, *Justice of the peace and acting coroner, Polk county, Iowa.*

Inquest on the body of James Murphy, held before Rollin V. Ankeny, coroner, August 19, 1896.

STATE OF IOWA, } ss.
POLK COUNTY. }

Thomas Knox, of lawful age, being duly sworn, testifies as follows: I am 49 years of age I am superintendent of Carbondale mine, Four Mile township I reside at the mine. James Murphy has been employed in the Carbondale mine No. 2 as a digger. This afternoon the pit boss told me James Murphy had been killed. I went down to the second west entry off the north room No. 2. I found a fall of slate in the room. I was told Murphy was under the slate. We went to work and got him out. It took us almost half an hour; he was dead when we got him out. The piece of slate that came down on Murphy was about twenty inches thick, about fifteen feet long and about twelve feet wide. The vein of coal at that place is about three feet and ten inches thick. The breast of coal was about fifteen feet from where the slate fell on Murphy. He had fired the shots at noon and had taken the car in to load when this slate fell. I was in that room last Monday forenoon. The roof was not in good or poor condition; it was what we call drawn a little, but I did not consider it dangerous. John Braniff was Murphy's partner. They worked together in the room where accident occurred. He is an experienced miner. I did not talk to Murphy in particular regarding roof, but I did to Braniff, and he knows as well as I do how to take care of a roof. When we got Murphy out from under the slate, we found that the front part of his skull was crushed, the right arm broken, the right shoulder crushed in the same manner over and into the right upper lung; all severe, and combined would cause death. Finding him dead, we did not call a physician. It is the duty of the miner to see that the roof of his room is properly propped. It is the duty of the company to furnish all props asked for by the miner, which we have on hand ready.

THOS. KNOX.

John Braniff, of lawful age, being duly sworn, testifies as follows: I am a coal miner in the employ of the Carbondale Coal company, working at mine No. 2. I have been a coal miner about eighteen years. Worked for Carbondale company three weeks. Have known James Murphy. He has been a coal miner about fourteen years. He and I were partners for the past three weeks. We had a double room, Nos. 2 and 3 in second west off the north. To-day, August 19, at noon we fired two shots. I did not deem the piece of slate dangerous. We had about four props under it when the shots were fired. It knocked the props out. We went back after dinner (Murphy and I). I stopped at the tool box and put a cotton in my lamp. Murphy went into room No. 2 and commenced to clean the track. I went up to the car and said to Jim, "How did the shots do?" He said he didn't know. I went to the face to see, and Murphy followed me. Both of us went directly under the piece of slate that fell. When I was close to the face of the coal, heard something crack behind me, and ran towards the face of the coal. He was not quick enough; it fell on him. Charles Erickson was standing close by. I told him to run for help. He went and brought several men in. I showed them about where Murphy was lying covered up. We commenced to move the slate away, and I came out of the mine. I afterwards saw him lying dead at the top of the mine. He was about 42 years of age; born in Durham county, England. Has been in the United States fifteen years. Been in Iowa almost all that time. He was a single man The company furnished us props when asked for. It is the duty of each miner to look after the condition and safety of the roof of his room There were loose props lying in our room at the time.

JOHN BRANIFF

William Peterson, being duly sworn, testifies as follows: I am a mule driver in Carbondale mine No. 2. After dinner to-day, August 19th, I went into the mine as far as the second west entry, off the north. Some one came out halloaing, "There is a man under the slate." I went into where he was. I saw we needed more help, and went down the entry and got more help. We commenced breaking up the slate so we could get him out. We worked there quite a bit till we found him. The man was James Murphy. He was dead. We put him in the car and took him out. I was in that room this forenoon. I did not know whether the roof was safe or not.

WILLIAM PETERSON.

Robert Berry, of lawful age, being duly sworn, testifies as follows: I am 24 years of age. Am in the employ of the Carbondale Coal company as mule driver in mine No. 2 To-day, about fifteen minutes past 1, I had come out on to the bottom, when they told me there was a man killed. I ran up to room No. 2, off the second west. We found a fall of slate and commenced breaking it to get the man out. We found the man was James Murphy, and he was dead. We put him in a car and took him out of the mine.

ROBERT BERRY.

STATE OF IOWA, } ss.
POLK COUNTY. }

At an inquisition holden at Carbondale mine, No. 2, in Four Mile township, Polk county, on the 19th day of August, 1896, before R. V. Ankeny, coroner of the said county, upon the body of James Murphy there lying dead, by the jurors whose names are hereunto subscribed. The said jurors upon their oaths do say that the said James Murphy came to his death in room No. 2, second west entry off the north, in Carbondale Coal mine, No.

2, situated in Four Mile township, Polk county, Iowa, about 1:15 o'clock P. M., August 19, 1896, at the place above described, by means of being crushed about the head and body by a fall of slate which caused his death. And we further find from the evidence before us that said accident, casualty, and death were purely accidental and not otherwise.

In testimony whereof we have hereunto set our hands this 19th day of August, 1896.

William Crowley,
Christ Smith,
W. K. Gatchell,
Jurors.

Attest:
R. V. Ankeny,
Coroner of Polk county, Iowa.

TABLE No. 4.

Showing the number and cause of all fatal casualties in District No. 3, for the biennial period ending June 30, 1897.

DATE.	NAME OF DECEASED.	CAUSE OF CASUALTY.	NAME OF COMPANY OR FIRM.	WHERE LOCATED.
August 8, 1895	Cornelius Jackson	Falling slate	Black Swan Coal company	Swan, Marion county.
October 9, 1895	John Phillips	Falling slate	West Riverside Coal company	Des Moines, Polk county.
October 11, 1895	Alfred Peterson	By suffocation	Story City Coal company	Summit, Story county.
October 11, 1895	Inglebert Inge	By suffocation	Story City Coal company	Summit, Story county.
October 11, 1895	George Payne	By suffocation	Story City Coal company	Summit, Story county.
October 11, 1895	Axel Eastland	By suffocation	Story City Coal company	Summit, Story county.
January 3, 1896	Alex Bell	Falling slate	Lake Park Coal company	Des Moines, Polk county.
April 23, 1896	Louie Romani	Falling slate	Boone Valley Coal & R. R Co.	Frasier, Boone county.
May 29, 1896	John Greenslede	Falling slate	Success Coal company	Dunreath, Marion county.
August 6, 1896	Joseph Werschay	Blown out shot	Carbondale Coal company	Four Mile Tp., Polk county.
August 19, 1896	James Murphy	Falling slate	Carbondale Coal company	Four Mile Tp., Polk county.
September 12, 1896	Frank Maas	Blown out shot	Carbondale Coal company	Four Mile Tp., Polk county.
September 14, 1896	Paul Molo	Explosion of powder	Christy Coal company	Youngstown, Polk county.
December 12, 1896	John Fairgrave	Fell off the tail chain	Boone Valley Coal & R. R. Co.	Frasier. Boone county.
December 17, 1896	J. E. Hazen	Falling slate	Black Swan Coal company	Swan, Marion county.
January 23, 1897	Peter McClellan	Falling coal	Pleasant Valley Coal company	Ft. Dodge, Webster county.
January 23, 1897	John Ray	Falling coal	Pleasant Valley Coal company	Ft. Dodge, Webster county.

TABLE No. 5.

Showing non-fatal casualties of the Third Mining District.

DATE.		NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
July	31, 1895	Joseph Wattan	Miner	Back wrenched	Fall of slate	Des Moines.
August	20, 1895	A. F. Johnson	Miner	Hand and leg bruised	Fall of slate	Des Moines.
September	11, 1895	C. E. Brott	Miner	Back injured	Fall of slate	Lehigh.
September	18, 1895	W. B. Reinhart	Miner	Leg broken	Struck by coal	Hamilton.
September	25, 1895	Edward Rosich	Miner	Injured internally	Fall of slate	Marquisville.
July	21, 1896	Herbert Viggers	Miner	Badly burned	Explosion of powder	Angus.
September	4, 1896	William Nichols	Miner	Back hurt	Fall of slate	Dunreath.
October	8, 1896	L. Davis	Miner	Head bruised	Shot fired	Des Moines.
October	21, 1896	Ed Stoner	Miner	Cut about head	Fall of slate	Runnells.
November	27, 1896	Mat Savage	Car trimmer	Head slightly bruised	Struck by coal from chute.	Carbondale.
November	28, 1896	William Johnson (col.)	Miner	Face and head bruised	Struck by coal.	Carbondale.
November	28, 1896	D. Fossin	Miner	Face burned	Struck by coal	Carbondale.
December	7, 1896	Charles Otterbein	Miner	Injured internally	Fall of coal and rock	Boonsboro.
December	22, 1896	Annis Walker	Miner	Injured internally	Fall of coal	Boone.
March	4, 1897	John Morris	Driver	Leg broken	Slipped off of chain	Des Moines.
March	29, 1897	Oscar Straus	Driver	Broken ankle	Foot caught between car and coal.	Runnells.
March	31, 1897	Charles Walkden	Miner	Arm broken	Fall of slate	Runnells.

IMPROVEMENTS MADE IN MINES DURING THE LAST TWO YEARS.

BOONE COUNTY.

NAME OF MINE.	Air shaft.	Second opening.	Stairways.	Cover on cages.	Safety catches.	Safety gates.	Brakes on drums.	Fan.	Furnace.
Crow & Marshall	....	....	...	1	1	1	1	1	....
Boone Valley Coal and Railroad company	1	1	....	1	1	1	1	1	....
Zimbelman Coal Mining company	1	1	....	...	....	....	...	....	....
Carpenter Coal Mining company, No. 2	1	1	....	1	1	1	1	1	....
Total	3	3	....	3	3	3	3	3	....

MARION COUNTY.

NAME OF MINE.	Air shaft.	Second opening.	Stairways.	Cover on cages.	Safety catches.	Safety gates.	Brakes on drums.	Fan.	Furnace.
Hawkeye Coal Mining company	1	1	1	1	1	1	1	1	....
Standard Coal company	1	1	1	1	1	1	1	....	....
Success Coal company	1	1	....	....	....	....	....	....	....
Total	3	3	2	2	2	2	2	1	..

DALLAS COUNTY.

NAME OF MINE.	Air shaft.	Second opening.	Stairways.	Cover on cages.	Safety catches.	Safety gates.	Brakes on drums.	Fan.	Furnace.
Dawson Coal Mining company	1	1	....	1	1	1	1	1	....
Total	1	1	....	1	1	1	1	1	....

GREENE COUNTY.

NAME OF MINE.	Air shaft.	Second opening.	Stairways.	Cover on cages.	Safety catches.	Safety gates.	Brakes on drums.	Fan.	Furnace.
Angus Coal Mining company	1	1	1	1	1	1	1	1	....
Total	1	1	1	1	1	1	1	1	....

POLK COUNTY.

NAME OF MINE.	Air shaft.	Second opening.	Stairways.	Cover on cages.	Safety catches.	Safety gates.	Brakes on drums.	Fan.	Furnace.
Carbondale Coal Mining company	1	1	1	1	1	1	1	1	....
Western Coal Mining company	1	1	1	1	1	1	1	1	....
Van Ginkel Coal Mining company	1	1	...	....	....	...	....	....	....
Bloomfield Coal Mining company	1	1	1	1	1	1	1	1	....
Eureka Coal Mining company	....	....	..	1	1	1	1	1	....
Total	4	4	3	4	4	4	4	4	....

WEBSTER COUNTY.

NAME OF MINE.	Air shaft.	Second opening.	Stairways.	Cover on cages.	Safety catches.	Safety gates.	Brakes on drums.	Fan.	Furnace.
Webster County Land and Coal company, No. 1	1	1	1	...	....	....	....	1	....
Webster County Land and Coal company, No. 2	1	1	1	....	..	....	....	1	....
Craig Coal Mining company	1	1	1	....	...	....	....	1	....
Total	3	3	3	....	....	....	....	3	....

HOME MARKET.

THE KEY TO PROSPERITY.

How to found a market with a demand extensive enough to utilize the output of coal that could be produced by the mines of Iowa if steadily operated to their full capacity is a question as important as it is problematic. The embarrassing condition of the trade the last few years, and the instability that exists at present, are apparently attributable to the lack of an adequate demand in an appreciative market. These facts are so obvious that we must realize that a diversion is necessary to anticipate any improvement in this line of commerce in the future. It should be converted to a channel that would render it more healthy, tangible and lucrative, and one that would be more in conformity with the amount of interest that capital and labor have involved in the business. If some practical method for an explicit solution of this problem could be advanced, and in a manner that would tend to keep the mines in steady operation twelve months in the year, it would be of inestimable value to the industry, and the emoluments to the state would be marvelous.

Twenty-five counties have coal fields or are possessed with good beds of coal, many of them productive, and many of them undeveloped simply for the want of some comprehensive inducement to capital and enterprise. The majority of those that are operative do not work more than one-third or one-half of the time because of an insufficient market. As to the exhaustion of the coal, there are no indications that it will be any way soon, as the resources are seemingly unlimited and ample to last for many generations. When a mine is worked out, or abandoned, it does not signify that the field is entirely destitute of coal, as many imagine. For instance, in the year 1882, there were several mines worked out or abandoned in Polk county. At that time only fifteen mines were in operation, while in the same field, in 1895, there were twenty-five mines of much larger capacity, thereby demonstrating the fact that new beds and new fields of coal can and will be discovered whenever it becomes evident to enterprise that there is a substantial market and an exigent demand for the product. It is not a question as to whether the coal can be produced, but the vital question is where to find or furnish a place to burn it at a fair compensation to the producers.

The annual output of the mines in the state is something over 3,000,000 tons, and the works running only about one-third or one-half of the time. Now, if an engrossing market could be contrived for the product, it could be increased to 9,000,000 tons, as the present capacity of the mines, if kept in steady operation, would be capable of accomplishing this without incurring any extra expense, and by adding more miners, and making a few certain changes in some of the mines at an expense that would be nominal, it would enlarge the capacity of the present number of mines to 12,000,000 tons. The value of the total product of 1895 was $4,300,000. If the mines were worked steady and run to their full capacity, the value of the output would exceed $12,000,000, a difference in the amount of revenue of nearly $8,000,000 annually. There are about 10,000 miners and employes in the state that depend almost exclusively upon this branch of industry for their maintenance, and being employed only four or five months in the year necessitates the practice of strict economy in domestic affairs to insure a living, while if they could have steady work the year round their total income would amount to $7,000,000 or $8,000,000 instead of $3,000,000 or $4,000,000, as it does now. Practically there is not much more expense to the operator in keeping the mine running 300 days in a year than three months, for when idle it requires about as much attention and expense to keep up repairs as when in operation.

From 1870 to 1880 we had a market for all the coal we could mine, and statistics show that the annual output was equal to what it is at the present time with a less number of well-equipped mines and a less number of miners, but the demand was sufficient to keep the mines in almost steady operation. Kansas, Nebraska and the northwest were the markets we entered with but little competition; but of late years Kansas, Colorado and Wyoming are producing large quantities of coal, and they having some advantages in the way of freights, competition has become so close that there is but small inducement for Iowa to enter the field as a competitor. While, no doubt, we are receiving an equal share of the trade, it is perceptibly smaller than in former years, and then we have Missouri on the south and Illinois on the east, two extensive coal producing states that are crowding our markets on the outside and along the borders of our state with a cheaper fuel than we can produce. Even the railroads are purchasing less coal than they formerly did, as the companies have built larger engines with about double the capacity of work of the ordinary engine and requiring very little more fuel to run them. Consequently our markets have become so stringent, not because Iowa coal is inferior in quality, for it is the equal of any in the western markets for any and all purposes, but it is because the resources have become greater and the demand less. Evidently the only alternative that will relieve the stringency of the situation and promote vigor and prosperity to the state is by building up home markets, rather than be contentious, and largely dependent upon a foreign and competitive market. It would be conducive of better results to encourage and assist enterprise in building factories in the coal territory, as every manufacturing establishment, regardless of the kind, if it takes fuel to run it, is a direct benefit to the coal industry. Operators and miners should take an especial interest in this matter, as I believe the future success of the business is dependent upon this. Build creameries, canning factories, brick and tile plants, or any enterprise that would have a tendency to increase the demand for coal. The brick and tile industry is of vast importance not only for the coal it consumes, but it gives employment to many, and then we have all the material and as good as there is in the United States for that purpose, and good markets in the state and outside of the state, for while western states may be fortunate enough to have plenty of coal, they have not the superior quality of clay that Iowa has for manufacturing brick and tile; hence, we can enter their markets with this product with but little competition and burn our coal at home. According to the last census, the total value of all brick and tile establishments in the state, in 1895, was $1,796 338; the amount expended for wages and manufacturing, $914 651; value of raw material furnished, $51,070 Add 8 per cent interest on value of investment and the total expense or outlay would be $1,109,518. The value of manufactured product was $1,638,756, showing a balance in favor of the industry of $529,238. This should be some inducement at least to build up and extend the business. Hundreds of tons of this manufactured product was shipped outside of the state. Some of it found a market as far west as Denver, Col., at a fair profit to the producer.

The counties of Boone, Polk, Mahaska, Marion, Monroe, Lucas, Appanoose and Wapello are especially adapted to this business, as they can furnish all the raw material. They have plenty of fuel and good shipping facilities, and are endowed with all the essentials necessary for making it a success. With a view to commercial advantages it seems to me there should be a more extensive interest taken in promoting this line of industry throughout the coal fields of the state. The benefit would be not only to the miner, the operator, and those identified with coal, but to every line of business or industry in the county. It would create a demand for other products, it would give employment to many hundreds outside of mining that would otherwise, perhaps, be unemployed. In fact, the material and commercial advantages evolving from this source are innumerable. Canned goods constitute another industry that should receive the indorsement of the residents of this district, as the propagation of factories of this kind would enhance the value of many products at home that otherwise are dependent upon an exterior market, and would be inducive to a more extensive cultivation of these supplies, as every coal county in the state is immensely rich in producing qualities of grain, fruit, vegetables, etc., and could supply, or be made capable of furnishing, all requisites for many establishments of this kind. The total value of all the plants in this line of business in the state in 1895 was $267,560. Their manufactured products are valued at $447,857, while their expense for material and wages, including 8 per cent on value of investment, only amounted to $269,312, showing a balance in favor of investments of $178,545, which is evidently conclusive that the business is fairly profitable. No doubt the bulk of these products could be disposed of in the markets of Iowa, for there are many thousands of dollars paid out annually for this class of goods, thereby compelling us to contribute to the revenue of other states for the manufacture of an article that could and should be manufactured at home.

This territory is also well adapted to dairy purposes, and the building of creameries is a matter that should be given due consideration, for there are unexceptionable advantages in the way of excellent pastures, fine rolling land, fertile soil, good water, and plenty of cheap fuel, with all the combined factors that would make it the equal of any country in the United States for the manufacturing of butter, cheese, and all perquisites connected with the creamery business.

The promotion of these three lines of the previously mentioned industries into this territory would be especially consistent with the surroundings, and should meet with approbation from at least a majority of the people of the coal district, for if all of the present establishments connected with these lines of industries were situated in any one of these coal counties they could easily furnish the raw material and supply every demand equal to what the whole state now is doing. These facts are practical and of more than ordinary significance, and if adhered to would enable these counties eventually to bring to a realization the objective points which I have endeavored to make manifest to the residents of this territory. Study these propositions considerately, let all become interested in this matter; operators, miners, farmers, mechanics, and business men of all classes. Invite capital to investigate these innumerable advantages. Give encouragement to enterprise, lend your assistance and aid as a unit in promulgating the object of the suggestions that will ultimately lead to prosperity, and when this is accomplished you will have built up a substantial market for the products of your country, a home market for the product of the mines, and a demand that will justify them in running to their full capacity; giving work to at least 10,000 miners 300 days in the year. The factory and the mine are undoubtedly subservient one to the other, and there should be a concerted action on behalf of both in accelerating the attainment of success. Let the two industries co-operate and establish a lasting mutuality, uniting their energies in the interest of home manufactures, and prosperity will shine on the rich, and apparently unlimited, coal belt of Iowa.

IOWA'S PIONEER COAL OPERATORS.

THOSE WHO WERE INSTRUMENTAL IN LOCATING AND DEVELOPING THE FIRST COMMERCIAL MINES IN THE STATE.

Dr. David Dale Owen, of the United States general land office, in his report made in 1852, was the first to attract the attention of the public to the fact that there were localities in Iowa where rich deposits of coal could be found, but it seems at that time, or prior to 1858, there was but little interest manifested in developing the coal fields of the state; at least there are no records or references either verbal or written wherein we can base calculations of any kind that would be reliable in regard to coal. There probably were some small mines—drifts or slopes, opened and coal dug for domestic use only, and it is presumed that the demand for coal at that time was of little consequence, as the majority of the early settlers of the state were former residents of a timbered country, consequently they sought localities near the timber, as they believed that to be the only reliable resource for fuel. But as the population increased the prairies were developed into farms, villages grew into towns, towns into cities, and factories and railroads were built. Then it was that the demand for fuel made it necessary for them to either import or produce their own coal with the knowledge, therefore, that the state was blessed with material to do the latter. Hence, subsequent results show that enterprise and capital became convinced that the coal industry was destined to become an important factor in Iowa's future commerce.

The first attempt made in collecting and compiling statistics of coal produced in the state was in the eighth United States census report of 1860. This report shows the total number of short tons produced in 1859 to be 48,263 valued at $92,180. This is the first historical record we have of the production of Iowa coal. The next was the ninth United States census report, of 1870, which gives the amount of coal produced in the year previous as 283,467 short tons, valued at a little more than $500,000.

In collecting these notes and reminiscences of the early days when the production of coal was a rarity in Iowa, I have endeavored to select nothing from references or data but that which I believe to be authentic and reliable. There will be nothing included here in regard to mines and operators except the shipping mines in the different parts of the state that were opened and operated prior to 1875.

The Iowa state census report, made in 1875, gives the number of tons of coal produced at 1,231,547 tons, valued at $2,500,140, showing a gain of five-fold in product and value in five years. I have no doubt that the bases of their statistics were collected from the local as well as the shipping mines, but there are no tables compiled giving names of operators or amount of coal each produced annually, so that we are compelled to seek information from different sources.

APPANOOSE COUNTY.

The first railroad mine opened in Appanoose county was in 1872, located on the southwest branch of the Chicago, Rock Island & Pacific railroad. The mine was known as that of the Watson Coal and Mining company, with C. O. Godfrey president, and James Brown superintendent. Mr. Godfrey came here from Boston and was engaged in several mining enterprises in the state at that time. At present he is a resident of St. Louis, Mo. Brown was experienced and had a practical knowledge of mining. He left Iowa in 1875, going to Brazil, Ind , and shortly afterward was killed by accidentally falling down a shaft while engaged in mining at that camp.

The next mine in the county, of any importance, was opened in 1873 by Cope & Glenn, of Bloomfield, Davis county, located near Cincinnati on a branch of the Chicago, Burlington & Quincy railroad. In the same year the third mine was opened by the Appanoose Coal and Mining company, located on old Missouri, Iowa & Nebraska road, known now as the Keokuk and Western Railway. J. W. Summers, of Keokuk, was president of the company at that time. The mine at the present time is owned and operated by the Centerville Block Coal company. In the following year Oliver and Dargavel opened what is known as the Diamond Coal company's mine, at Centerville, near the Chicago, Rock Island & Pacific railroad.

BOONE COUNTY.

There was some local mining done in Boone county prior to 1865, but in a very limited way. In that year the Chicago & North-Western railway reached the county, opening transportation to other markets, and was an incentive to enterprise in developing the coal field. The first shipping mine in this county was a slope opened in 1867 by T. N. Canfield and C. S. Taylor just west of Boonesboro', but shortly afterward they sunk a shaft 242 feet deep, and the company with but one change in its organization has continued in business at this place for nearly thirty years, hoisting coal out of the same shaft, hauling the product to the railroad in wagons, a distance of three miles, for the first few years. In 1874 the company was reorganized with Delos Arnold, president; C. H. Sherman, manager, and T. N. Canfield, treasurer. The company then built a railroad at its own expense from the mine to Boone, connecting with the main line of the Chicago & North-Western Eventually it was purchased, and is now operated by the railroad company In 1867, the Moingona Coal company opened a mine at Moingona, on the Chicago & North-Western railroad; John Hall, of Cedar Rapids, president, and W. Blythe, superintendent; John I. Blair, of New Jersey, was also a stockholder. At one time this company operated six mines in this vicinity, and for several years did an extensive business, their output being from 800 to 900 tons per day As soon as the Chicago & North-Western railroad reached Council Bluffs the company shipped the principal part of its product to that point, and sold it to the Union Pacific Railroad company. After the coal mines at Carbon, Wyo., were opened, the Moingona company had to seek other markets for its coal. At the present time there is but little mining done here, but in its palmy days it was a scene of great activity and one of the largest camps in the state.

In 1874 the Northwestern Coal and Mining company was formed, with the Hon. J. F. Duncombe, of Ft. Dodge, president; Oliver Ames, of Boston, and Gen. G. M. Dodge shareholders. I have been unable to ascertain who was the first superintendent of this plant. A few years after a reorganization of the company took place, when Gen. G M. Dodge became president of the company, and W. D. Morgan, superintendent The mine did quite a shipping business for a number of years. While mentioning the name of Gen. G. M. Dodge as president of this company, we wish to vary from coal business long enough to call the attention of those interested in relics of the late war to the fact that there is now in Boone county the desk that was used by General Dodge during the rebellion. It has the stamp of U. S. on it in several places. It was sent here for use in the company's office, and is still in the county. I believe it would be a valuable addition to the collection of relics in the State Historical Department

HARDIN COUNTY.

There was a mine opened near Eldora, Hardin county, in the year 1868, by a company that had C. C. Gilman as president, and William Phillips as superintendent. The mine was successfully operated for some time, but the vein of coal was below the bed of the Iowa river, and the consequence was that water gave them a great deal of trouble and expense, especially when the river was high. Finally the company was compelled to abandon the mine and seek other coal fields in the state that could be operated to a better advantage and at less expense. Mr. Phillips was an experienced miner and came to Hardin county in 1867, from Maryland, where he had previously been a successful mine operator for many years.

JEFFERSON COUNTY.

The Jefferson County Coal company opened a mine at Perlee, on the Chicago & Southwestern railroad, in 1868. The Hon. James F. Wilson, of Fairfield, was president of the company, and R H. Herrford, superintendent. The mine did quite a lucrative business for a number of years.

JASPER COUNTY.

The Watson No 1 was the first shipping mine in Jasper county. A company was formed in 1871. They elected John Aberheardt president, and James Miller superintendent In that year the company developed the above mine, located four miles east of Colfax and about three miles south of the main line of the Chicago, Rock Island & Pacific railroad. A switch was built connecting the mine with the road over which the principal part of the product was shipped to markets outside of the county. The mine had a good run, and the company did a prosperous business for a number of years. They eventually sold the mine to C F. Godfrey & Company.

The Couch mine, located three miles south of Newton, was put in operation in 1873 F. S. Griggs and D. S. Couch were the owners and operators. A switch was built from the mine to the Rock Island railroad. D. S. Couch was the mine superintendent, and has been interested in mining in that county until recently.

MAHASKA COUNTY.

The first mine in this county of any importance, that we have any authentic account of was located about half way between Oskaloosa and Beacon, on or near the public highway that connects the two towns. John and James Burdess opened the mine and put it in successful operation in the year 1862.

A co-operative company was formed at Beacon in 1864 by nine men, each subscribing $500 as capital stock for the purpose of developing and operating a mine in the vicinity of Beacon (then called Oskaloosa Station), located on the Keokuk and Des Moines branch of the Chicago, Rock Island & Pacific railroad. The following were the nine stockholders in the company: J. G. Jones, E. J. Evans, D. J Evans, Watkin Price, D. S. Davis, Daniel Davis, J. S. Morgan, Thomas Griffith and J. W. Rodeffer. A tram road was built from the mine to the railroad. Mules were used as the locomotive power to deliver the coal on the track where it was dumped into cars ready for shipment. The company did a flourishing business for about two years, and then sold the mine to Thomas Haight, of Keokuk, and Wesley Redhead, of Des Moines, who gave it the name of the Iowa Oil and Coal Company mine. A short time after this, J. W. Rodeffer, of Keokuk, bought an interest in the mine again and was elected president of the company. In 1872 George Williams, of Keokuk, superintendent of the Des Moines Valley Railway company, bought out the stockholders, and became sole proprietor of the mine. Simon Phillips was appointed general manager. They made some improvements and in 1873 the mine had a capacity of over 400 tons per day, being at that time the largest mine in the state.

In 1864 Thomas Haight and E. J. Evans opened a mine near Given, and constructed a tramway connecting with the Des Moines Valley railway, using mules in hauling the coal to the railroad. John Baxter, who was the superintendent of this mine, is still a resident of that vicinity.

In 1869 J. W. Huggins, of Ottumwa, and Dr. A. C. Predue, opened the Coal Valley mine at Muchakinock and built one mile and a quarter of railroad connecting with the Iowa Central at Given. Huggins was president and Predue was general manager. The company did a fair business for several years.

Mine No. 1 of the Consolidation Coal and Mining company was opened in 1873, at Muchakinock. The officials of the company when first organized were: C. C. Gilman, president; H. W. McNeill, general manager; and William Phillips, superintendent. Many changes have taken place in the company since its formation, but the camp developed into one of the most prosperous and largest camps in the state. A branch of the Chicago & North-Western railway connects Muchakinock with the main line at Belle Plaine, and the bulk of the coal is sent out over this line.

In 1874 the Eureka Coal Mining company, composed of Robert Lowry, George L. Davenport, William Larrabee, C. C. Cole and J. K. Graves, opened a mine one mile southwest of Beacon. They had for their superintendent H. H. Heard. The mine was connected by a switch from the Keokuk & Des Moines Valley railroad. They did an extensive business until they consolidated with the Consolidation mines at Muchakinock, when the mine was abandoned.

MONROE COUNTY.

This county played quite an important part in the early production of coal in the state, and does yet. In 1868, McBride, Clark & Predue opened the Avery mines three miles west of Frederick and six miles east of Albia, on the Chicago, Burlington & Quincy railroad. They had two shafts in operation, one close to the railroad track, the other one mile away, from which they moved the coal to the railroad by means of an iron tramway, operated by mules. In 1870, McBride and Clark retired, and afterwards the firm was known by the name of J. W. and A. G Huggins & Predue. The Hugginses lived in Ottumwa, and Predue in Oskaloosa.

In 1869 a mine was opened at Coalfield, on the Iowa Central railroad, four miles west of Eddyville, called the Black Diamond Coal company's mine. Thomas Haight, Keokuk; E. J Evans, Beacon; Gov S. J. Kirkwood and Ezekiel Clark, Iowa City, and Wesley Redhead, Des Moines, were the incorporators. It did a large business for a number of years.

In 1870, at the same place, another mine was opened, with H. W. McNeill, Oskaloosa, president; William Phillips, superintendent; and W. A. McNeill, secretary. They gave employment to about seventy-five miners at one time, but abandoned this mine when they opened the mines at Muchakinock.

POLK COUNTY.

There were numerous small mines in Polk county, worked principally in the winter season for a small local trade only, up to the year 1871, when the Sypher mine, afterward known as the Polk County mine, opened up as the first shipping mine. Mr. Sypher and John Phillips were the first owners and operators. The location of this mine was one mile south of the state capitol. It had a connecting switch with the Rock Island railroad. Many changes took place, and the mine was operated by several different companies before it was abandoned.

In 1872, the Watson and Eclipse mines were opened. The former was located east of the state capitol. A switch connected the mine with the Chicago, Rock Island & Pacific railroad. For several years it was successful, and proved a good investment to its incorporators. C. O. Godfrey was president and James Brown superintendent. The mine has long ago been abandoned. The latter, or Eclipse mine, was located south of the Des Moines river and about one and a quarter miles south of the state capitol. Its first officers were J. B. Yeoman, president, and Thomas Beck, superintendent. They had quite an extensive trade, shipping their coal over the Chicago, Rock Island & Pacific.

In fact, these three mines were the only ones of commercial importance in the county prior to 1874. In that year the Pioneer and Eureka mines were established and became operative. Wesley Redhead was president and James Clark superintendent of the Pioneer company, which was located near the Seventh street bridge on the south side of the river. The location of the Eureka mine was one mile due south of the state capitol, and it was in active operation for over twenty years. Norman Haskins was president and James Cormac superintendent when the company was first organized. The originality of the company was changed numerous times before the mine was worked out or abandoned. These mines were dependent upon the Chicago, Rock Island & Pacific railroad for transportation of their product. John Walters, Daniel Rees and James Miller can be classed as among the pioneer operators, as they were closely identified with the early discovery and development of the coal fields in this county.

WAPELLO COUNTY.

This county was one of the earliest producers of coal in the state, and was destined at one time to continue to be so, but she fell behind in her production and other counties took the lead. In 1868 this county had shipped 52,000 tons of coal out of one mine, which was the largest mine in the state and had shipped more coal than any other mine up to that time. It furnished large quantities of coal for the Keokuk market, and the article was considered of first-class quality. This mine was opened in 1865 by C. J. Love, and was operated by him for a number of years. It was situated at Alpine station on the Keokuk & Des Moines Valley railroad.

The Union Coal company, consisting of O. C. Godfrey president, and James Brown superintendent, with others, opened a mine in 1867 four miles north of Ottumwa, which was connected by a branch from the main line of the Chicago, Burlington & Quincy railroad. At this mine J. C. Osgood received his first lessons in mining. He afterwards became one of the most successful mine operators in the state.

The Hawkeye Coal Mining company was formed, and the mine was opened in the year 1873, by the following stockholders: James Harlan, Christ. F. Blake, and L. W. Vale. This company was afterwards called the C. F. Blake Coal Mining company, and did considerable business for a number of years.

A company was formed in Ottumwa in 1871, called the Ottumwa Coal Mining company. The stockholders were James D. Ladd, W. W. Ladd, Thomas D. Ladd, Amos D. Moss, W. B. Bonifield, and W. M. Kind. It opened and operated a mine in the vicinity of Ottumwa for some time.

WEBSTER COUNTY.

The Ft. Dodge Coal and Mining company opened a mine in Webster county in 1870. The president of the company was J. L. Platt; superintendent, Thomas Flemming. The mine was located on Holiday creek, and about three miles south of the Illinois Central railroad. They built a tramway the entire distance, utilizing mule power in delivering coal to the road. After a few years of prosperity, it became subservient to the company's interest to widen the track and substitute steam power for that of mule, as the latter was inadequate.

The Duncombe & Richards mine was opened in the latter part of 1870 by J. F. Duncombe and Mr. Richards. In 1871 W. C. Wilson, of Webster City, opened a mine at Lehigh, and subsequently formed the Crooked Creek Coal and Railroad company. J. L. Platt, Hon. J. F. Duncombe, and the Hon W. C. Wilson are really the pioneers of the coal industry in Webster county, as to them belongs largely the credit of its development in its early history.

LEGAL DECISIONS ON MINING QUESTIONS.

Duty of mine operator cannot be escaped by delegation.—No duty devolving upon the owner or operator of a coal mine, or other work of a dangerous character, can be delegated to an agent or employe, so as to relieve the owner or proprietor of his personal responsibility. No duty required of him for the safety and protection of his employes can be transferred to another so as to exempt him from his liabilities. He may, and often must, delegate the performance of such duties to subordinates; but he assumes the responsibility to all his servants, for the acts of those subordinates in that particular capacity, to the same extent as if those acts were literally his own. And a duty enjoined, either at common law or by statute, which is omitted, and by reason thereof injury occurs to some of the employes in the service of the delinquent party, it is the direct negligence of the person owing the duty, and not of his employes. *Cherokee and P. Coal and Mining Co. v. Britton*, 45 Pacific Reporter, 101. (Court of Appeals of Kansas.)

Liability is based on knowledge and lack of ordinary care.—Before the owner or operator of a coal mine can be held liable for the death of one of his employes engaged in mining coal caused by the falling of loose rock or earth from the roof of the mine, it must be shown that the owner or operator had previous knowledge of the defective condition of the roof, or by the exercise of ordinary care and caution he could have discovered the defective condition. The owner or operator is only held to the exercise of ordinary care in the employment of competent and skillful operators and superintendents, and in the construction and repair of the mine, so as to make it reasonably safe for the protection of those employed therein. And it is not evidence of negligence, or that he had knowledge of the defective condition of a roof, when he makes repairs immediately after an accident has occurred. *Cherokee and P. Coal and Mining Co. v. Britton*, 45 Pacific Reporter, 101. (Court of Appeals of Kansas.)

Injury to employe by mule in mine.—An employe of a coal and iron mining company lost his foot while leading a mule attached to a coal car in one of the underground corridors of the mine He claimed that the mule was vicious to the knowledge of the company, and that he was negligently and carelessly assigned to lead the mule in the business of drawing coal from the place where it was mined to the shaft; that he was ignorant of its vicious disposition, and on the day in question it became ugly, bit at him, struck at him with the fore feet, broke away, got loose, and in endeavoring to control the animal his lamp went out, and he caught his foot in the switch, and one of the wheels of the car passed over it, smashing it, and requiring amputation. The evidence of knowledge on the part of the mining company was denied. The superintendent of the company testified that its witnesses, who were brought from a foreign state, did not discuss the facts, while witness admitted that he talked them over with the superintendent during the journey, and when asked if they all on the train agreed that the mule was one of the best answered: "If we did, I would not tell you." Some other matters to which they testified were rather improbable. The court on appeal held that the evidence justified a verdict against the mining company. *Szuchy v. Hillside and Iron Co.*, 37 N. Y. S. Reporter, 457. (Supreme Ct. App. Div. 2d Dept. N. Y)

Assumption of risk by coal miner.—The supreme court of Indiana in a recent decision said: The occupation of coal mining, where the employe must go into, as it were, the very bowels of the earth, by means of shafts and tunnels made for that purpose, and to work in rooms made by the removal of earth, slate, and coal, is one of unusual peril, and those who engage in it necessarily assume great risks. The nature of the employment is in itself so very hazardous that those who engage in it must know that it is attended with risks against which human foresight and skill cannot guard. One of the dangers attendant upon mining is that from falling earth, stone, slate and coal. These dangers are greatest, perhaps, in the rooms where the miner works, while the tunnels or entry through which he may have to pass to and from his work can be more or less guarded and protected. That as to all of the dangers ordinarily incident to the employment the employe assumes the risks is elementary law; but to determine what are the risks naturally and ordinarily incident thereto is not always easily done, depending to a very great extent upon the nature of the employment. It may be safe to state, however, as a general proposition, that under the usual and ordinary contracts of employment between a master and a servant, whether the engagement be for services in a factory, on a railroad, or in a coal mine, the master undertakes to use reasonable care to see that his machinery is in good condition and repair and that the place where the servant is to work is free from dangers other than those which are naturally incident upon the work to be performed. Hence, when it is said that a master operating a coal mine shall furnish his servants a reasonably safe place to work, it is not intended that the place shall be so timbered and guarded that rock, slate, earth or coal cannot fall, because to so protect the working place must necessarily destroy the ability to operate the mine. And, if the place furnished by the master appears to the servant to be free from any dangers except those which are naturally incident to the work, a servant, unless he sees that it is not so, has a right to assume that the master has performed his duty and that the place is as it appears. It other words, the servant is not bound to seek for latent defects or dangers which do not necessarily arise from the nature of the employment, and against which it is the duty of the master to use reasonable care to guard. And, when it is said that the servant assumes the risk of dangers of which he has knowledge, it is not meant that he assumes no risks except from dangers of which he has actual knowledge, or which are patent, for he does assume the risk of latent as well as patent dangers, which are a natural incident to the service, and which it is not the duty of the master to guard against; that is, dangers, whether visible or invisible, known or unknown, at the time of employment, if they are such as naturally arise from the nature of the work to be performed, he assumes. It is for this reason that he is required to exercise reasonable care to ascertain and know of dangers which may exist or even arise suddenly and confront him during his service. He cannot shut his eyes to dangers that are obvious to those engaged with him who are ordinarily prudent. Unless the servant by his contract of employment agrees to, or the nature of the services to be rendered requires, that he inspect the place where he has to work for hidden or latent defects which are simply the result of the master's inattention or negligence, he is not bound to do so. The duty of inspection to ascertain and guard against dangers and defects not naturally incidental to the work to be performed by the servant rests upon the master. But, as to dangers which are naturally incident to the service, the servant is bound to acquaint himself, even to the extent, if necessary to do so, of a minute and thorough inspection. Hence, those dangers which an experienced miner knows must and do threaten him at all times are an incident to the service, and are assumed by him. *Linton Coal and Mining Co. v. Persons*, 43 N. E. Rep., 652.

Injury to coal miner.—In an action for injury claimed to result from the illegal negligence of a coal mining company, the burden of proof is on the miner, and he must show that the negligence complained of was the proximate cause of the injury. Where he willingly encounters a danger which is known to him the employer is not responsible for the injury that may result. *Massie v. Peel Splint Coal Co.* (Supreme Ct. App , W. Va.) 24 Southeastern Reporter, 644.

Assumption of risk by mine employe.—An employe was injured by falling through a hole in an unfinished platform placed across a section of a salt mine shaft, near the bottom of the shaft. He had been working for the mining company about nine months, in sinking the shaft, and adjusting the timber work, and in making platforms at intervals, had daily traveled up and down the shaft, and was perfectly familiar with the nature of the work. The accident occurred while he, with another employe, was working on a platform where it was dark, and after he, at the request of his companion, had blown out his miner's lamp, provided by the company, and while the platform was lighted only by the candle used by his companion. He testified that he did not know of the hole, but admitted that if he had placed the light near the floor of the platform he could have seen the opening. The court held that he assumed the risks. *Sharpsteen v. Livonia Salt and Mining Co.* (Supreme Ct. App. Div., 4th Dept.) 38 N. Y. S. Reporter, 49.

Non-liability of coal company for injury to employe.—An employer was not liable for the death of an employe by his falling after having been caught by a rope, part of a hoisting apparatus, which commenced to tighten up just as he was stepping over it, where the employe was fully acquainted with the apparatus, and it was working as usual on the day of the accident, and the employe had been forbidden and his duties did not require that he should cross the rope. *O'Brien v. Staples Coal Co.* (Sup. Jud. Ct., Mass.) 43 N. E. Reporter, 181.

Fire in mine: contributory negligence of miner.—Where a miner, after having been notified of the outbreak of a fire in a mine in time to permit him to reach the shaft in safety, unnecessarily lingered in the mine, without notifying the men on the surface of his intention to do so, and it appears it would have been proper to stop a fan, which caused a circulation of air in the mine, or keep it running according to the location of the fire, a nonsuit on the ground of contributory negligence should be granted in an action to recover for his death, as said miner had no right to assume that those in charge of the fan knew the location of the fire, though the jury also find that the negligence of the mining company in stopping the fan was one of the concurrent causes resulting in the death of such miner. *Pugh v. Oregon Imp. Co.* (Supreme Ct. Wash.) 44 Pacific Rep , 547

COAL PRODUCTION OF THE WORLD.

The steady advance of the United States in industrial development is well illustrated by the following figures: In 1868 and 1869, when the total output of the world was about 225,000,000 tons, the United States yielded but 14 per cent. In 1892, 1893, 1894 and 1895 the world's output exceeded 500,000,000 tons each year, of which the United States contributed about 30 per cent, thus having doubled its percentage. Great Britain, whose mines yielded more than 50 per cent of the world's product in 1868, now barely exceeds the product of the United States.

The output of the coal mines of the United States in 1895 exceeded that of any previous year in the history of the country, aggregating 172,426,366 long tons, an increase of about 13 per cent over the product for 1894. How, in the face of such seemingly prosperous conditions, is the falling off in value to be accounted for?

The coal-producing states maintained their same relative positions in 1895 as in 1894, as follows:

Pennsylvania, 57 per cent of the total.
Illinois, 13 per cent of the total.
Ohio, 7 per cent of the total.
West Virginia, 6.9 per cent of the total.
Alabama, 4.2 per cent of the bituminous output.
Iowa, 3.1 per cent of the bituminous output.

The other states come in the following order: Maryland, Kentucky, Colorado, Kansas.

DEEPEST HOLE IN THE WORLD.

BORING IN SILESIA REACHES A DEPTH OF MORE THAN A MILE.

[From The Scientific American.]

The deepest bore hole in the world is one of 6,571 feet below the surface of the soil, made at Parnschowitz, near Rybrick, Upper Silesia. The previous record for depth was the 5,733 foot hole drilled some years ago at Schladebach, near Leipsic. The later bore hole was made in a search for coal measures, and eighty-three seperate seams, some of considerable thickness, were penetrated. The hole was twelve inches in diameter at the beginning, and this was lined with a tube, about four-tenths of an inch thick; at a depth of twenty feet the bore was reduced to eight and one-fourth inches in diameter, and thus continued for 351 feet. At this point the blue marl encountered became so compact that the diamond drill had to be used, and under the action of the water the marl swelled to such a degree that the diameter of the pipe had to be again reduced. The greatest difficulty encountered was the great weight of the boring rods as the depth increased. Though steel was used, at a depth of 6,560 feet the total weight of the tools reached 30,155 pounds.

SUMMARY.

In order that a complete review of the mining industry may be had, we have summarized the reports of the three districts in the following tables:

TABLE No 1.

Showing number of mines, number of tons of coal produced, number of miners and other employes, total amount paid miners and other employes, value of product at mines, etc., for the year ending June 30, 1896.

NO. OF DISTRICT.	Number of mines.	Number of tons of coal produced.	Number of miners employed.	Number of all other employes.	Average price per ton paid for mining.	Total amount paid miners.	Total amount paid all other employes.	Total value of product at mines.	Average selling price per ton at mines.	Expense of tracking, props, etc., at mines.
District No. 1......	160	989,768	3,329	1,119	$ .79	$ 779,825	$ 379,645	$1,296,363	$ 1.31	$ 25,161
District No. 2......	96	1,476,700	2,591	1,036	.75	1,119,740	374,750	1,887,032	1.27	169,530
District No. 3......	99	1,059,022	2,479	897	.76	810,391	286,735	1,495,478	1.41	112,186
Total.........	355	3,525,490	8,399	3,052	$ .77	$2,709,956	$1,041,130	4,678,873	1.33	306,877

TABLE No. 2.

Showing number of mines, output of coal, number of miners and other employes, amount paid miners and other employes, value of product at mines, etc., for the year ending June 30, 1897.

NO. OF DISTRICT.	Number of mines.	Number of tons of coal produced.	Number of miners employed.	Number of all other employes.	Average price per ton paid for mining.	Total amount paid miners.	Total amount paid all other employes.	Total value of product at mines.	Average selling price per ton at mines.	Expense of tracking, props, etc., at mines.
District No. 1......	154	1,025,706	3,275	1,069	$ .79	$ 812,494	$ 396,004	$1,292,260	$ 1.26	$ 20,380
District No. 2 ...	100	1,572,240	2,552	1,040	.75	1,185,450	374,450	1,915,465	1.22	180,225
District No. 3......	106	1,201,788	2,737	912	.78	934,442	350.170	1,648,079	1.37	174,511
Total.........	360	3,799,734	8,564	3,021	$ .77	$2,932,386	$1,120,624	$4,855,804	$ 1.28	$ 375,116

TABLE No. 3.

Showing the grand total for the state for the biennial period ending June 30, 1897.

NO. OF DISTRICT.	Average number mines in operation.	Number of tons of coal produced.	Average number of miners employed.	Average number of all other employes.	Average price per ton paid for mining.	Total amount paid miners.	Total amount paid to all other employes.	Total value of product at mines.	Average selling price per ton at mines.	Total expense of tracking, props, etc, at mines.
District No. 1......	157	2,015,474	3,302	1,094	$ .79	$1,592,319	$ 775,649	$2,588,623	$1.28	$ 45.541
District No. 2	98	3,048,940	2,573	1,038	.75	2,305,190	749,200	3,802,497	1.24	349,755
District No. 3......	103	2,260,810	2,608	855	.77	1,744,833	636,905	3,143,557	1.39	286,697
Grand total..	358	7,325,224	8,483	2.987	$ .77	$5,642,342	$2,161,754	$9,534,677	$1.30	$ 681.99

IOWA MINING LAWS.

IOWA MINING LAWS.

CHAPTER 9 OF THE CODE.

SECTION 2478 *Inspectors.* The governor shall appoint three mine inspectors from those receiving certificates of competency from the board of examiners hereinafter provided for, who shall hold their office two years and until their successors shall be appointed and qualified, subject to removal by him for cause, their term to commence on the first Monday of April of each even-numbered year. Any vacancies occurring shall be filled in the same manner, the appointee to hold for the unexpired term only. Each inspector shall be in no way connected with or interested in mines or mining in the state, and shall, before entering upon the discharge of his duties, take an oath, to be indorsed upon his bond, faithfully and impartially to perform the same, and also give a bond in the sum of two thousand dollars with sureties, to be approved by the secretary of state, conditioned in accordance with the tenor of the oath, which shall be filed and, with the oath and commission, recorded in the office of the secretary of state. [21 G. A., ch. 140, §§ 1, 3, 5; 20 G A., ch 21, §§ 1, 3, 5.]

SEC. 2479. *Board of examiners.* The executive council shall appoint a board of five examiners, two of whom shall be practical miners, two mine operators, and one a mining engineer, each of whom shall have had at least five years' experience in his profession, each of whom shall hold office for two years, and shall qualify by taking an oath to the effect that he will faithfully and to the best of his ability perform the duty of examining candidates for the office of mine inspector, and truly try any charges made against any such inspector, and that, in recommending candidates, he will be governed by the evidence of qualification to fill the position under the law, without fear, favor or political or personal considerations, and will grant certificates of competency to candidates according to their merits and the requirements of law. [22 G. A., ch 52, § 22.]

SEC. 2480. *Meetings—compensation.* Said board shall meet in the office of the state mine inspectors in the capitol on the first Monday in March of each even-numbered year for the examination of applicants; notice of which examination shall be published in at least one newspaper in each mining district not less than fifteen days preceding the date of such examination; and shall be furnished with the necessary stationery and other material for the examination in the same manner as other state officers are provided with supplies. The members shall receive as compensation for their services the sum of five dollars per day for the time actually employed, with necessary traveling expenses, which shall be audited and paid in the manner provided for the salaries of other state officers, but in no case shall the per diem exceed fifty dollars a session to each member. [Same, § 23.]

SEC 2481. *Examination—qualification of candidates.* The examination shall consist of oral and written questions in theoretical and practical mining and mine engineering, on the nature and properties of noxious and poisonous gases found in mines, and on the different systems of working and ventilating coal mines. During the progress of the examination, books, memoranda or notes shall not be allowed or used, and the board shall issue to those examined and found to possess the requisite qualifications certificates of competency for the position of mine inspector; but certificates shall be granted only to persons of twenty-five years of age or over, of good moral character, citizens of the state, and with at least five years' experience in the practical working of mines, and who have not been acting as agent or superintendent of any mines for at least six months next preceding such examination. [Same, §§ 24, 25; 21 G. A , ch 140, § 1; 20 G. A , ch. 21, § 1.]

SEC. 2482. *Inspection districts—powers and duties of inspector.* The governor shall divide the state into three inspection districts, and assign one inspector to each district, who shall devote his entire time to his work. and before entering thereon, procure, to be paid for by and to belong to the state, all instruments necessary for the discharge of his duties, including a complete set of standards, balances and other means of adjustment in testing any and all apparatus used in weighing, and shall examine, test and adjust, as often as occasion demands, all scales, beams and other apparatus used in weighing coal at the mines. He shall examine all the mines in his district as often as the time will permit, keep a record of the inspections made, showing date, the condition in which the mine is found, the extent and manner in which the laws relating to the government of mines and their operation are observed and obeyed, the progress made in improvements for the better security to health and life, number of accidents happening and their character, the number employed, and such other and further matters as may be of public interest and connected with the mining industries of the state. He shall have the right at all reasonable times, by night or by day, to enter any mine in his district, or any district to which he may be sent by the governor, for the purpose of ascertaining its condition and the manner of its operation, by making personal examination and inquiry in relation thereto, but not so as to unnecessarily obstruct or impede the working of the mines; and to this end the mine owner or person in charge shall furnish such mine inspector all assistance in his power, and forthwith, upon the happening of any accident to any miner in or about the mine by reason of the working thereof which causes loss of life, shall report the same, by mail or otherwise, to the mine inspector and the coroner of the county. Each inspector shall have and maintain, at some suitable place in his district, to be approved by the governor, an office, and shall reside in the district and remain there, unless otherwise engaged in the conduct of his official duties. [22 G. A., ch. 54, § 21; 21 G. A., ch. 140, §§ 1, 2, 6; 20 G. A., ch. 21, §§ 1, 2, 6]

SEC. 2483. *General office—report to governor—compensation.* The three inspectors shall maintain a general office in the capitol, and keep therein all records, correspondence, documents, apparatus, or other property pertaining to their office; they shall meet in said office biennially on or before August fifteenth preceding the regular session of the general assembly, and make report to the governor of their official doings, including therein all matters which by this chapter are specially committed to their charge, adding such suggestion as to needed future legislation as in their opinion may be important. Each inspector shall receive for his services the sum of twelve hundred dollars per annum and actual traveling expenses, not exceeding five hundred dollars yearly, the traveling expenses to be paid quarterly upon an itemized statement duly verified and audited by the state auditor. [22 G. A , ch. 52, § 1; 21 G A., ch. 140, §§ 3, 4; 20 G. A., ch. 21, §§ 3, 4.]

SEC. 2484. *Removal of inspector.* Charges of gross neglect of duty or malfeasance in office against any inspector may be made in writing, sworn to and filed with the governor, and must be made by five miners, or one or more mine operators; they shall be accompanied with a bond in the sum of five hundred dollars, running to the state, executed by two or more freeholders, approved and accepted by the clerk of the district court of the county of their residence, conditioned for the payment of all costs and expenses arising from the investigation of the charges, and thereupon the governor shall convene the board of examiners at such time and place as he may designate, giving the inspector and the person whose name first appears in the charges ten days' notice thereof. The board, at the time and place fixed, shall proceed to hear, try and determine the matter, and for this purpose shall summon any material witness desired by either party, and may administer the proper oath to all witnesses. Evidence may also be taken by deposition as in other cases, and continuances of the hearing may be granted in the furtherance of justice and upon the application of either party. After the evidence has been fully heard, the board shall report to the governor the results of its investigation, and if the charges are sustained the inspector shall be forthwith removed by the governor, and in any event the costs and expenses of the hearing shall be awarded against the inspector or the bondsmen as the case may be. [21 G. A., ch. 43; 20 G. A., ch. 21, § 16.]

SEC. 2485.—*Maps of mines—surveys—double damages.* The owner or person in charge of any mine shall make or cause to be made an accurate map or plan of the same, on a scale of not less than one hundred feet to the inch, showing all the area mined or excavated, and on or before the first day of September of each year cause to be made a statement and plan of the progress of the working of the mine up to date, which progress shall be clearly indicated upon the map hereinbefore required; a failure to comply with this provision for sixty days shall authorize the inspector of the district to cause the same to be done at the expense of the owner, which may be recovered in an action against him by the person doing the work, and the map so made shall include and cover the entire mine. All maps shall be kept exposed in the office of the mine, and said maps shall be subject to public inspection. The owner of any mine which is worked out or abandoned, or his agent, shall deliver a correct map thereof to the inspector to be filed in his office. Upon affidavit of any adjoining land owner in the vicinity of said mine, or his agent, that it is necessary for the protection of his property to know how near his land the excavations in the mine extend, the inspector shall make an examination, employing a surveyor therefor, if necessary, to determine the length and direction of entries leading toward the land of the applicant and the extent of excavation of same on all of his land, if any, and make report of the same to him. The necessary expenses, including compensation of five dollars per day each to the inspector and surveyor, shall be paid by the applicant, except when it shall be shown that said applicant's property has been undermined, in which case, the expense shall be paid by the mine owner or operator Any owner or person operating a mine, who, without permission, takes coal from adjoining lands, shall be liable in double damages therefor and for all expenses caused thereby. [20 G. A., ch. 21, § 7.]

SEC. 2486. *Escape and air-shafts.* The owner or person in charge of any mine operated by shaft, or one having a slope or drift opening in which five or more men are employed, shall construct and maintain at least two distinct openings for each seam of coal worked, which in shaft mines shall be separated by natural strata of not less than one hundred feet in breadth, and in slope or drift mines not less than fifty feet in breadth, through which ingress and egress at all times shall be unobstructed to the employes, and in slope or drift mines shall be provided with safe and available traveling-ways; all traveling-ways and escapes to be kept free from water and falls of roof. All escape-shafts not provided with hoisting appliances as hereinafter provided shall have stairs at an angle of not more than sixty degrees in descent, kept in safe condition, with proper landings at easy and convenient distances apart. He shall provide all air-shafts where fans are used with working fans for ventilation, and those used for escapes with suitable appliances for hoisting underground workmen, at all times ready for use while the men are at labor, and no combustible material shall be allowed to be or remain between any escape-shaft and hoisting-shaft, save as it may be absolutely necessary in the operation of the mine. A furnace-shaft, if large enough, may be divided into an escape and a furnace-shaft, the partition to be of incombustible material for a distance of not less than fifteen feet from the bottom thereof, and so constructed throughout as to exclude the heated air and smoke from the side used as an escape-shaft. Where two or more mines are connected underground, the several owners, by joint agreement, may use the hoisting shaft or slope of the one as an escape for the other. In all cases where escape-shafts are constructed less than one hundred feet from the hoisting-shaft, there shall be built and maintained an underground traveling-way from the top of the escape-shaft, so as to furnish the proper protection from fire for a distance of one hundred feet from such hoisting-shaft. No escape-shaft shall be located or constructed without first giving notice to the district inspector, who shall determine the distance it shall be from the main shaft, and without his consent it shall not be less than three hundred feet, nor shall any building except the fan-house be placed nearer than one hundred feet of the escape; but the provisions of this chapter relating to escape-ways shall not apply to mines where the same are lost or destroyed by reason of the drawing of pillars preparatory to the abandonment of the mine, and in such mine not more than twenty persons shall be employed at one time. [22 G. A., ch. 56, §§ 1, 2; 20 G. A., ch. 21, §§ 8, 9.]

[These provisions appear to have been enacted for the protection of miners in case of accident, and to require open and unobstructed means of escape. They do not require that all entries in the mines shall be propped or roofed with timber or other materials: *Fosburg v. Phillips Fuel Co.*, 61 N. W , 400]

SEC. 2487. *Time for constructing outlets.* In all mines there shall be allowed one year to make outlets as provided for in section twenty-four hundred and eighty-six, but not more than twenty men shall be employed in such mine at any one time until the provisions of section twenty-four hundred and eighty-six are complied with; and after the expiration of the period above mentioned, should said mine not have the outlets aforesaid, it shall not be operated until made to conform to the provisions of section twenty-four hundred and eighty-six.

SEC. 2488. *Ventilation.* The owner or person in charge of any mine shall provide and maintain, whether the mine be operated by shaft, slope or drift, an amount of ventilation of not less than one hundred cubic feet of air per minute for each person, nor less than five hundred cubic feet of air per minute for each mule or horse employed therein, which shall be so circulated throughout the mines as to dilute, render harmless and expel all noxious and poisonous gases in all working parts of the same; to do this, artificial means by exhaust-steam, forcing-fans, furnaces, or other contrivances of sufficient capacity and power, shall be kept in operation. If a furnace is used, it shall be so constructed, by lining the up-cast for a sufficient distance with incombustible material, that fire cannot be communicated to any part of the works. When the mine inspector shall find the air insufficient, or the men working under unsafe conditions, he shall at once give notice to the mine owner or his agent or person in charge, and, upon a failure to make the necessary changes within a reasonable time, to be fixed by him, he may order the men out, to remain out until the mine is put in proper condition. [22 G. A., ch. 56, § 3; 20 G A., ch. 21, § 10]

SEC. 2489. *Safety appliances—competent engineers—boys not employed.* The owner or person in charge of any mine shall in all mines operated by shaft or slope, where the voice cannot be distinctly heard, provide and maintain a metal speaking-tube or other means of communication, kept in complete order from the bottom or interior to the top or exterior, also a sufficient safety catch and proper cover over head on all cages, and an adequate brake to all drums or other devices used for lowering or hoisting persons, an approved safety gate at the top of each shaft, springs at the top of each slope, and a trail attached to each train used therein. He shall not knowingly place in charge of any engine used in or about the operation of the mines any but experienced, competent and sober engineers, who shall not allow any one but those designated for that purpose to handle or in any way interfere with it or any part of the machinery, nor shall more than ten persons be allowed to descend or ascend in any cage at one time, or such less number as may be fixed by the district mine inspector, nor any one but the conductor on a loaded cage or car. He shall not allow a boy under twelve years of age to work in the mines, and, when in doubt regarding the age of one seeking employment, shall, before engaging him, obtain the affidavit of the applicant's parent or guardian in regard thereto. He shall at all times keep a sufficient supply of timber to be used as props, convenient and ready for use, and shall send such props down when required and deliver them to the places where needed. [20 G. A., ch 21, §§ 11-13, 18.]

[As to an employe not chargeable with the duty of looking after the safety of the entries in which he is employed, the mine owner does not discharge his duty by simply providing props for use, but is responsible for the general safety of the entry: *Carson v. Coal Hill Coal Co.*, 70 N. W., 185.]

SEC. 2490. *Scales and weighers—records—payment in money.* The owner or operator shall, if the miners are paid by weight, provide the mine with suitable scales of standard make, and require the person selected to weigh the coal delivered from the mine to be sworn before some person authorized to administer oaths, to the effect that he will keep the scales correctly and truly balanced, and accurately weigh and a true record keep of each car delivered, which oath, with that of the check-weighman hereinafter provided for, shall be conspicuously displayed with record of weights at the place of weighing, which record shall carry the account of each miner by itself, be open to the inspection at all proper times of miners and all others having a pecuniary interest in the mine, and all damages sustained on account of a failure to weigh and credit to the proper person any coal mined shall be recoverable in an action brought within two years from the time the right thereto accrued, and a knowledge of a violation of this provision by the miner shall not be a defense thereto. The miners employed and working in any mine may furnish a competent check-weighman, who, before entering upon his duties, shall make and subscribe to an oath to the effect that he is duly qualified and will faithfully discharge his duties as check-weighman, and he shall at all proper times have access to and the right to examine the scales, machinery or apparatus used in weighing and seeing all measures and weights of coal mined and the accounts kept thereof; but not more than one person on the part of the miners collectively shall have this right, and such examination and inspection shall be so made as to create no unnecessary interference with the use of such scales, machinery or apparatus. The owner or agent shall, where the miner is by contract to be paid by the ton or other quantity, unless otherwise agreed upon in writing, weigh the coal before screening, and the miner shall be credited at the rate of eighty pounds to the bushel and two thousand pounds to the ton, but no payment shall be demanded for sulphur, rock, slate, black-jack, slack, dirt or other impurities which may be loaded or found with the coal. Where ten or more miners are employed, such owner or agent shall not sell, give, deliver or issue, directly or indirectly, to any person employed, in payment for labor due or as advances for labor to be performed, any script, check, draft, order or other evidence of indebtedness payable or redeemable otherwise than in money at the face value, and he shall not compel or in any manner endeavor to coerce any employe to purchase goods or supplies from any particular person, firm, company or corporation; but all wages shall be paid in money upon demand semi-monthly. A failure or refusal to make payment within five days after demand shall entitle the laborer to recover the amount due him, and one dollar per day additional for each day such payment is neglected or refused, not exceeding the sum due, and in any action therefor the court shall tax as a part of the costs a reasonable attorney fee to plaintiff's attorney [25 G. A., ch 98; 22 G. A., ch. 53, §§ 1-3; 22 G A, ch. 54, §§ 1, 3; 22 G. A., ch 55, § 1.]

SEC 2491. *Penalties.* The owner or person in charge of any mine, who shall have or use any scales or other appliances for weighing the output of coal so arranged that false or short weighing may be done thereby, or shall knowingly resort to or employ any means whatever by which the coal is not correctly weighed, reported and recorded as in this chapter provided, or any weighman or check-weighman who shall falsely weigh, report or record the weights of coal, or connive at or consent to such false weighing, reporting or recording, or any such owner or agent, who shall fail to comply with the provisions of this chapter, or either of them, or shall obstruct or hinder the carrying out of its requirements, or any one who shall, or shall attempt to, compel or coerce any employe of any owner or person operating a mine to purchase goods from any particular person, shall be punished by imprisonment in the county jail not exceeding sixty days, and by a fine not exceeding five hundred dollars; or if any miner, workman or other person shall knowingly injure or interfere with any air course or brattice, or obstruct or throw open doors, or disturb any part of the machinery, or disobey any orders given in carrying out the provisions of this chapter, or ride upon a loaded car or wagon in the shaft or slope, except as herein provided, or do any act whereby the lives and health of the persons or the security of the mines and machinery is endangered, or shall neglect or refuse to securely prop or support the roof and entries under his control, or neglect or refuse to obey any order given by the superintendent in relation to the safety of the mine in that part under his charge and control, he shall be punished by fine not exceeding one hundred dollars, or imprisonment in the county jail not exceeding thirty days. [22 G. A., ch. 53, §§ 4, 5; 22 G. A., ch. 55, § 2; 20 G. A., ch. 21, §§ 15, 19.]

[Under a prior statute making it criminal without exception for anyone to ride on a loaded car, *held*, that a conductor thus riding in the discharge of his duty was not to be held guilty of wrong in so doing: *Crabell v. Wapello Coal Co.*, 68-751.]

SEC. 2492. *Failure to provide for safety of employes.* In addition to any and all other remedies, if any owner or person in charge of any mine shall fail to provide any of the appliances herein required for th safety of the employes, or the appliances provided do not conform to the requirements herein specified, or such owner or agent shall neglect, for twenty days after notice given in writing by the district mine inspector of such failure, to remedy the same, such inspector may apply to the district court, or any judge thereof, in an action brought in the name of the state, for a writ of injunction to restrain the working of the mine with more persons at the same time than are necessary to make the improvements needed, save as may be required to prevent waste, until such appliances have been supplied, and in case an injury happens to those engaged in work because of such failure, the same shall be held culpable negligence. [22 G. A, ch. 56, § 4; 20 G. A, ch 21, § 14.]

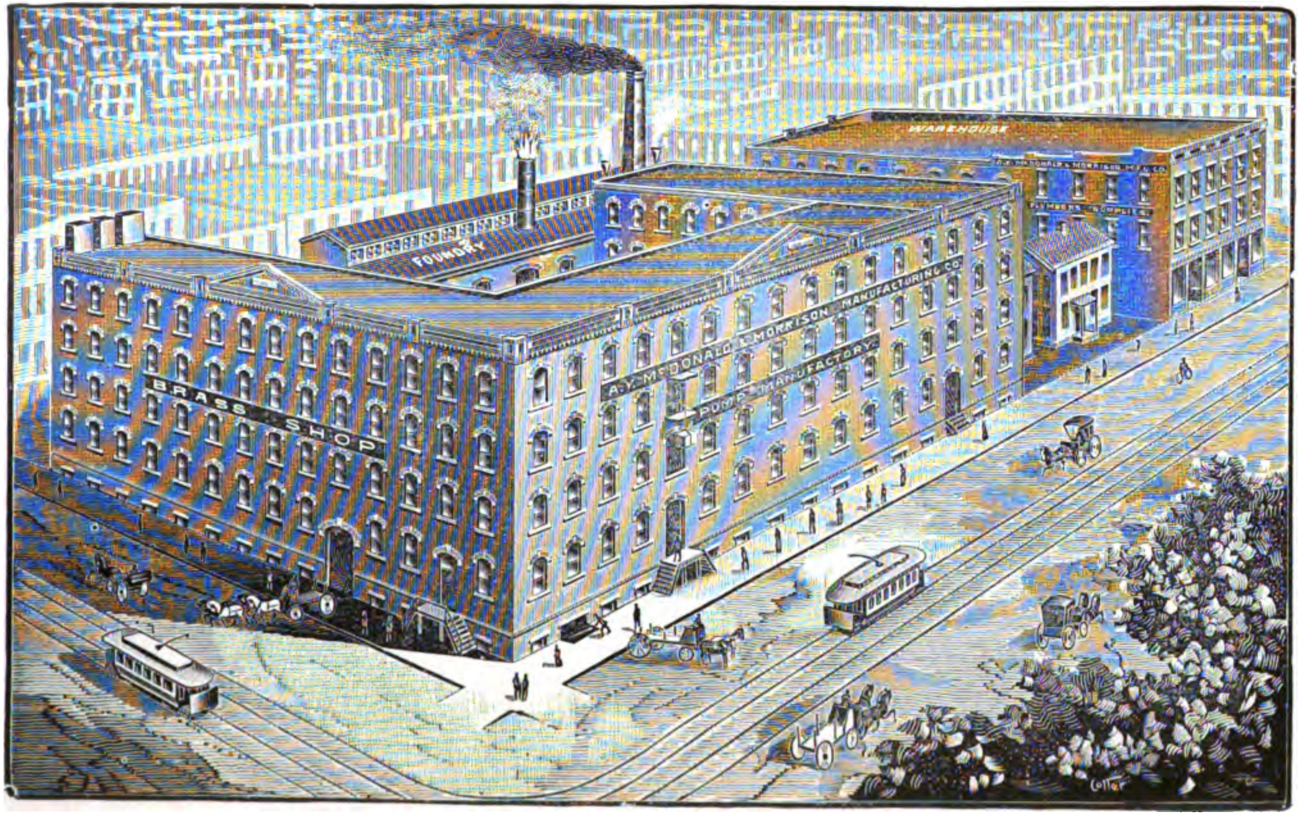
PROVISIONS AS TO ILLUMINATION.

SEC. 2493. *Purity of oil.* Only pure animal or vegetable oil, paraffine or electric lights shall be used for illuminating purposes in any mine in this state, and for the purpose of determining the purity of oils the state board of health shall fix a standard of purity and establish regulations for testing said oil, and said standard and regulations, when so determined, shall be recognized by all the courts of the state. [26 G. A, ch 92, § 1; 26 G. A., ch. 93.]

SEC. 2494. *Penalty.* Any person, firm or corporation, either by themselves, agents or employes, selling or offering to sell for illuminating purposes in any mine in this state any adulterated or impure oil, or oil not recognized by the state board of health as suitable for illuminating purposes as contemplated in this chapter, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than twenty-five dollars nor more than one hundred dollars for each offense; and any mine owner or operator or employe of such owner or operator who shall knowingly use, or any mine operator who shall knowingly permit to be used for illuminating purposes in any mine in this state any impure or adulterated oil, or any oil the use of which is forbidden by this chapter, shall, upon conviction thereof, be fined not less than five dollars nor more than twenty-five dollars. [26 G. A., ch. 92, § 2.]

SEC. 2495. *Testing oil.* It shall be the duty of the state mine inspector, whenever he has reason to believe that oil is being used or sold, or offered for sale, in violation of the provisions of this chapter, to take samples of the same and have them tested or analyzed, and if they are found to be impure he shall make complaint to the county attorney of the county wherein the offense is committed, who shall forthwith commence proceedings against the offender in any court of competent jurisdiction. All reasonable expenses, incurred in testing or analyzing oil under the provisions of this section shall be paid by the owner of the oil whenever it shall be found that he is selling or offering to sell impure oil in violation of the provisions of this chapter. Such costs may be recovered in a civil action, and in criminal prosecutions such expense shall be taxed as part of the costs. [Same, §§ 3, 4.]

SEC. 2496 *Provisions applicable.* The provisions of this chapter shall apply only to coal mines. [Same, § 5.]


WAREHOUSE
A. Y. McDONALD & MORRISON MFG. CO.
PLUMBERS SUPPLIES
FOUNDRY
BRASS SHOP
A. Y. McDONALD & MORRISON MANUFACTURING CO.
PUMP MANUFACTORY
Collier

A. Y. McDONALD & MORRISON MANUFACTURING CO., DUBUQUE, IOWA—IOWA STREET.

SEVENTH BIENNAL REPORT

OF THE

Bureau of Labor Statistics

FOR THE

STATE OF IOWA.

1895-96.

W. E. O'BLENESS, Commissioner.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY

DES MOINES:
F. R. CONAWAY, STATE PRINTER.
1897.

LETTER OF TRANSMITTAL.

OFFICE OF THE COMMISSIONER OF LABOR STATISTICS,
DES MOINES, IOWA, September 6, 1897.

Hon. F. M. Drake, Governor of Iowa:

Sir—In compliance with the law creating the Bureau of Labor Statistics, I have the honor herewith to transmit to you the Seventh Biennial Report of this department.

Very respectfully,

W. E. O'BLENESS,
Commissioner.

INTRODUCTORY.

In the report of the Bureau of Labor for 1894 and '95 some very strong recommendations were made for a new law governing the office; a law that would enable the commissioner to disseminate information and facts, not estimates. The Twenty-sixth General Assembly took the matter under consideration, and, after long and thorough investigation brought about the following law:

CHAPTER 132.

BUREAU OF LABOR STATISTICS.

AN ACT to Create a Bureau of Labor Statistics, and to Provide for the Appointment of a Commissioner of said Bureau, and to Define his Duties and Term of Office.

Be it Enacted by the General Assembly of the State of Iowa:

SECTION 1. That there is hereby created a bureau of labor statistics, to be under the control and management of a commissioner thereof, to be appointed as hereinafter provided by this act.

SEC. 2. That the governor shall, within thirty days after the taking effect of this act and biennially thereafter, with the advice and consent of the executive council, appoint a commissioner of labor statistics. The term of office of said commissioner to commence on the first day of April in each even-numbered year and continue for two years and until his successor is appointed and qualified; and said commissioner before entering upon the discharge of his duties shall take an oath or affirmation to discharge the same faithfully, and to the best of his ability; and shall give bond in the sum of two thousand dollars ($2,000), with sureties to the approval of the governor, conditioned for the faithful discharge of his official duties

SEC. 3. Said commissioner shall receive a salary of fifteen hundred dollars per annum, and shall be allowed a deputy at a salary of one thousand dollars per annum in lieu of clerk hire, payable monthly, and necessary postage, stationery, and office expenses, the said salary and expenses to be paid by the state as the salaries and expenses of other state officers are provided for. The commissioner, or any officer or employe of the bureau of labor statistics, shall be allowed in addition to their salaries their actual and necessary traveling expenses while in the performance of their duties; said expenses to be audited by the executive council and paid out of the general fund of the state upon a voucher verified by the commissioner, provided that the total of such expenses for officers and employes shall not exceed $500 per annum. He shall have and keep an office in the capitol at Des Moines in which shall be kept all records, documents, papers, correspondence, and property pertaining to his office, and shall deliver them to his successor in office.

SEC. 4. Said commissioner may be removed from his office by the governor for neglect of duty or malfeasanee in office; and any vacancy occurring at any time may be filled by the governor by and with the consent of the executive council.

SEC. 5. The duties of said commissioner shall be to collect, assort, systematize, and present in biennial reports to the governor, on or before the 15th day of August preceding each regular meeting of the general assembly, statistical details relating to all departments of labor in the state, especially in its relations to the commercial, social, educational, and sanitary conditions of the laboring classes, and to the permanent prosperity of the mechanical, manufacturing, and productive industries of the state, and shall as fully as practicable collect such information and reliable reports from each county in the state, the amount and condition of the mechanical and manufacturing interests, the value and location of the various manufacturing and coal productions of the state, also sites offering natural or acquired advantages for the profitable location and operation of different branches of industry. He shall by correspondence with interested parties in other parts of the United States impart to them such information as may tend to induce the location of mechanical and producing plants within the state, together with such other information as shall tend to increase the productions and consequent employment of producers; and in said biennial report he shall give a statement of the business of the bureau since the last regular report, and shall compile and publish therein such information as may be considered of value to the industrial interests of the state; the number of laborers and mechanics employed; the number of apprentices in each trade; with the nativity of such laborers; mechanics' and apprentices' wages earned; the savings from the same, with age and sex of laborers employed; the number and character of accidents; the sanitary condition of institutions where labor is employed; the restrictions, if any, which are put upon apprentices when indentured; the proportion of married laborers and mechanics who live in rented houses, with the average annual rental and the value of property owned by laborers and mechanics; and he shall include in such report what progress has been made with schools now in operation for the instruction of students in the mechanic arts and what systems have been found most practical, with details thereof.

Such report when printed shall not consist of more than 600 printed pages octavo.

Five thousand copies thereof shall be printed and bound uniformly similar to the reports of other state officers as now authorized by law. Said reports when published to be disposed of as follows, viz: To the public libraries in the state, to the various trades organizations, agricultural and mechanical societies, and other places where the commissioner may deem proper and best calculated to accomplish the furtherance of the industrial interests of the state.

SEC. 6. The commissioner of the bureau of labor statistics shall have the power to issue subpœnas, administer oaths, and take testimony in all matters relating to the duties herein required by said bureau, said testimony to be taken in some suitable place in the vicinity to which testimony is applicable. Witnesses subpœnaed and testifying before the commissioner of the bureau shall be paid the same fees as witnesses before a justice court, such payment to be made out of the contingent fund of the bureau in advance; but such expense for witnesses shall not exceed $100 annually. Any person duly subpœnaed under the provisions of this section, who shall wilfully neglect or refuse to attend or testify at the time and place named in the subpœna shall be deemed guilty of a misdemeanor, and upon conviction thereof, before any court of competent jurisdiction, shall be punished by a fine not exceeding $50 and costs of prosecution, or by imprisonment in the county jail not exceeding thirty days; provided, however, that no witness shall be compelled to go outside the county in which he resides to testify.

SEC. 7. The commissioner of the bureau of labor shall have the power upon the complaint of two or more persons, or upon his failure to otherwise obtain information in accordance with the provisions of this act, to enter any factory or mill, workshop, mine, store, business house, public or private work, when the same is open or in operation, upon a request being made in writing, for the purpose of gathering facts and statistics such as are contemplated by this act, and to examine into the methods of protection from danger to employes, and the sanitary conditions in and around such buildings and places, and make a record thereof; and any owner or occupant of such factory or mill, workshop, mine, store, business house, public or private work, or any agent or employe of such owner or occupant who shall refuse to allow any officer or employe of said bureau to so enter, or who shall hinder him, or in any way deter him from collecting information, shall be deemed guilty of a misdemeanor, and upon conviction thereof, before any court of competent jurisdiction, shall be punished by a fine of not exceeding $100 and costs of prosecution, or by imprisonment in the county jail not exceeding thirty days.

SEC. 8. The expression "factory," "mill," "workshop," "mine," "store," "business house," and "public or private work," as used in this act, shall be construed to mean any factory, mill, workshop, mine, store, business house, public or private work, where five or more wage-earners are employed for a certain stipulated compensation.

SEC. 9. It shall be the duty of every owner, operator, or manager of every factory, mill, workshop, mine, store, business house, public or private work, or any other establishment where labor is employed, as herein provided, to make to the bureau, upon blanks furnished by said bureau, such reports and returns as said bureau may require for the purpose of compiling such labor statistics as are contemplated in this act; and the owner, operator, or business manager shall make such reports or returns within sixty days from the receipt of blanks furnished by the commissioner, and shall certify under oath to the correctness of the same. Any owner, operator, or manager of such factory, mill, workshop, mine, store, business house, public or private work, as herein stated, who shall neglect or refuse to furnish to the commissioner of labor such reports or returns as may be required by the following blank, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding $100 and costs of prosecution, or imprisoned in the county jail not exceeding thirty days.

BLANK.

Name of firm or corporation .... Number of hands employed during year ending December 31, ...: Males, ... ; females, ...; apprentices, ... Total amount of wages paid during year ending December 31, ..., $........... Total amount of wages paid previous year, $........... Any general increase or reduction of wages during the past year? If so, what per cent of increase or reduction? .... Cause of increase or reduction? .... Any increase or decrease of business during past year? .... What means are provided for the escape of employes in case of fire? .... What measures are taken to prevent accident to employes from machinery? .... How are the buildings ventilated? .... Are separate water-closets and wash-rooms provided for the different sexes? .... Number of weeks during past year business was run on full time with full force, ... Number of weeks during past year business was run on short time or with reduced force, ... Number of weeks during past year business was suspended, ... Number of strikes during year ending December 31, ..., ...; number involved, ...; alleged cause, ...; result, ... How many days did strike continue, and what was loss of wages in consequence thereof? .... Was any property destroyed, and if so, its value? ....

SEC. 10. In the reports of the commissioner no use shall be made of names of individuals, firms or corporations supplying the information called for by sections 5 and 6 of this act, such information being deemed confidential and not for the purpose of disclosing personal affairs, and any officer or employe of the bureau of labor statistics violating this provision shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in a sum not exceeding $500 and costs of prosecution, or by imprisonment in the county jail not exceeding one year.

SEC. 11. No report or return made to said bureau in accordance with the provisions of this act, and no schedule, record or document gathered or returned by its officers or employes shall be destroyed within two years of the collection or receipt thereof. At the expiration of two years all records, schedules, or papers accumulating in said bureau during said period that may be considered of no value by the commissioner may be destroyed, provided the authority of the executive council be first obtained for such destruction.

SEC. 12. This act being deemed of immediate importance, shall be in force and take effect from and after its publication in the Iowa State Register and Des Moines Leader, newspapers published in Des Moines, Iowa.

A careful reading of the above and a comparison with the old law bring the reader to a realization that the facts con-

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DUBUQUE, IA.
MANUFACTURERS OF GOODS FOR WATER, STEAM, AND GAS PIPEING

tained in the following pages were gathered in a very different manner from those of preceding reports. The strictest reliability can be placed in the following tables, as they are simply copies of the various pay-rolls of the different institutions throughout the state, therefore are correct. Besides this, every report is sworn to by the business manager or proprietor of the institution from which the report emanates.

In the sixth biennial term an attempt was made to gather statistics from employers under the old law. Several hundred communications were sent out to employers of labor in different parts of the state with the request that they give the information sought for. The commissioner personally visited a number, requesting them to answer the questions asked. This several readily agreed to do, while others, knowing that it was not compulsory, simply paid no attention to the request, with the result that but twenty-four responded to the questions propounded.

The law which was enacted by the Twenty-sixth General Assembly went into effect about the 20th of April, 1896. The blanks were prepared according to the act, and then it became necessary to know who employed five or more persons, that the blanks might be sent them to make their report on. To obtain this information was a very difficult task, as there was nowhere in the state a list of names stating the number of persons employed. The commissioner or his deputy was therefore compelled to visit every city and almost every town in the state to get a list, that would be reliable, of those employing five or more persons. This took time—a great deal of time—but was accomplished, and correctly, too. These names are recorded alphabetically and by counties, and will be a guide to those who may occupy this office in the future. At the beginning of this term it was the intention to have the employes make a statement the same as in former years, in addition to the reports of employers, but getting together and preparing the list just referred to took so much time that it became necessary to abandon that portion of the work for this term.

The new law is so much an improvement over the old one that there is no comparison, yet there are several places wherein it could be still more improved—could be made much more effective—thereby greatly enhancing the work, giving to the state better returns for the money expended.

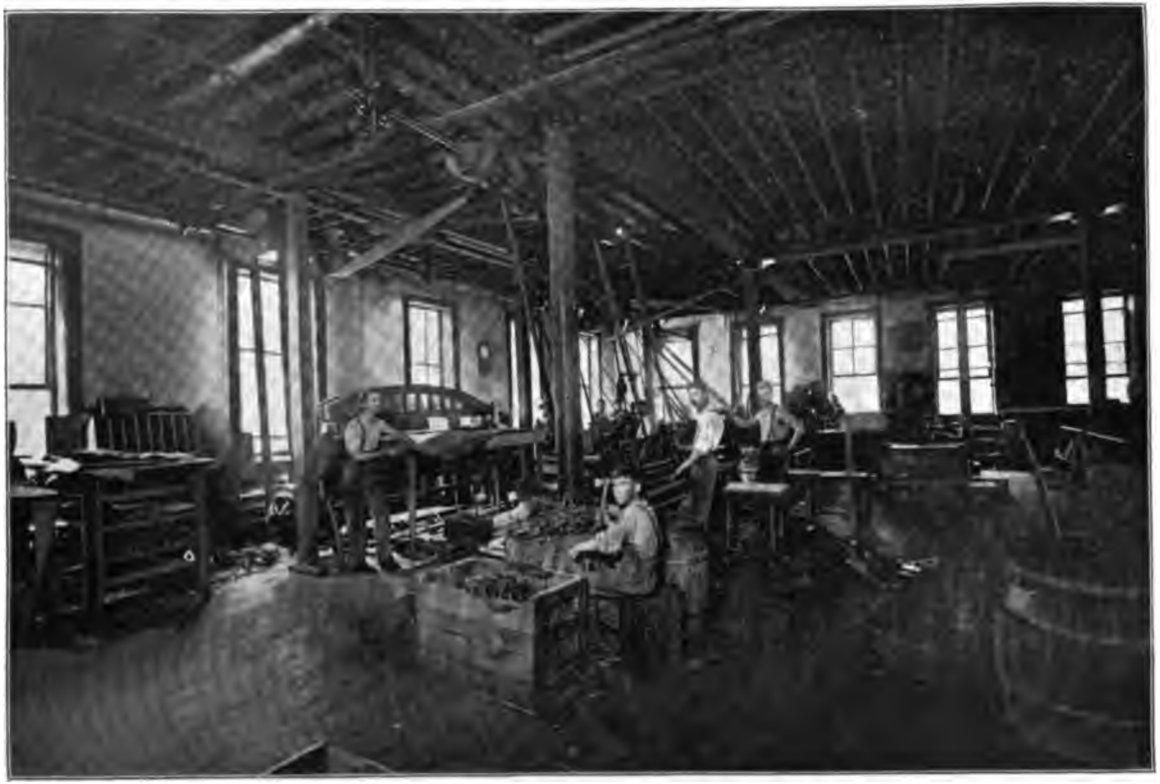
This office has been looked upon as a sinecure by some of the legislators, and therefore claim was laid that it should be abolished. It is gratifying to note, however, that those who so considered it were those who would not come into the office to investigate the work that was being carried on there. They were prejudiced from the fact that they were ignorant of the work and, be it said to their shame, did not care to be informed. Those who were most enthusiastic for the enactment of a new law that the office might be of some practical benefit to the state were those who came, saw and studied. These invariably went away satisfied that the office could be made one of the most useful in the state.

RECOMMENDATIONS.

The reports of the Bureau of Labor Statistics are published biennially. These reports are valuable to the student and doctrinaire, who out of past conditions desires to spin theories to govern future actions; but to the man dependent upon his daily labor for his daily bread, a knowledge of what the condition of the laboring people was two years ago sinks into insignificance compared with a knowledge of how he can better his own condition now. The length of time which necessarily elapses between the completion of much of the work and the publication of the report greatly diminishes its practical value to those for whose main benefit the office was established. Labor statistics, in order to be of real value to laboring people, must be up to date and published at frequent intervals. Therefore, your commissioner recommends that a bulletin, such as the National bureau and the Massachusetts bureau and other states are now publishing, be published by this bureau quarterly.

GUARDS AND BOILER INSPECTION.

There are a few persons and corporations employing men who have no railing or guards around dangerous machinery, fly wheels and vats. There are a large number of steam boilers being fired by incompetent boys and men. Numerous requests have come to this office asking that these matters be looked into and regulated. Nothing could be done by this office further than to advise and suggest, from the fact that there is no law on the statute books of Iowa regulating the same. There should be a law compelling employers to box or cover all dangerous machinery and shafting, place railings around fly wheels and



SOLE LEATHER ROOM, THE HUISKAMP BROS. SHOE CO., KEOKUK.

vats, and there should be some person vested with the power to enforce the same. There ought to be some person whose duty it should be to see to it that no one would be allowed to fire a steam boiler who could not stand a competent examination. Many lives are in constant danger from incompetent handling of steam boilers. Accidents happen in the best regulated institutions, and the utmost care should be exercised to throw about employes all the safety appliances possible. A very large per cent of the institutions in the state employing labor are very careful in this respect, having in vogue every safety appliance possible, besides the strictest orders to their employes to be careful. This is as it should be. For the few who do not seem to care anything about the safety of their employes, your commissioner makes the above recommendations.

POLL TAX.

To the average person, poll tax has come to be regarded as one of the most inequitable and burdensome taxes levied. It is not levied upon a man's financial ability to pay, but rather upon one's physical structure to work it out.

Section 1499 of the code of Iowa, reads:

> Each person liable to perform labor on the highway as poll tax, who shall fail or neglect to attend, either in person or by satisfactory substitute, at the time and place appointed, with the designated tool, implement or team, having had three days' notice thereof, or having attended, shall spend his time in idleness, or disobey the supervisor, or fail to furnish said supervisor, within five days thereafter, some satisfactory excuse for not attending, shall forfeit and pay to said supervisor the sum of three dollars for each day's delinquency; and in case of failure to pay such forfeit within ten days, the supervisor shall recover the same by action in the name of the supervisor; AND NO PROPERTY OR WAGES BELONGING TO SAID PERSON SHALL BE EXEMPT TO THE DEFENDANT ON EXECUTION; said judgment to be obtained before any justice of the peace in the proper township, which money, when collected shall be expended on the public highway.

Following will be found the records of some of the largest cities in the state, showing the methods in vogue for the collection of this tax:

In Des Moines there are supposed to be over ten thousand persons liable for this tax, of which, in 1895, 13 paid it in cash to the city treasurer, 4,311 working out the tax. In 1896, 47 paid it in cash, 4,280 working it out. It cost the city $2,500 to collect the tax for each year, $720 of which went to a poll-tax clerk and the balance to notifiers. Three dollars was the sum to be collected from each able-bodied male citizen between the ages of 21 and 45.

Chapter 12, section 8, revised ordinances of the city of Des Moines, reads as follows:

> In case any person who is liable to perform such labor shall fail to attend and perform the same at the time and place required in such notice, he shall forfeit and pay to the city the sum of $3 for each day's delinquency, and in case he shall fail to pay such forfeit within ten days thereafter the city treasurer may recover the same by action in his name before any justice of the peace in the township in which such delinquent resides, and when collected by such justice he shall pay the same to the city treasurer or the attorney for the city attending the case.

In Sioux City 2,979 persons are liable for this tax. In 1895 300 of them either paid or worked out the tax, and in 1896, 385 did the same thing. In 1895 it cost the city $200 to collect the tax and in 1896, $240. It has regularly appointed poll tax collectors who receive a salary of $2 per day while employed. The tax is collected under the following ordinance:

An ordinance to provide for and enforce labor on the streets, alleys and highways within the city of Sioux City.

Be it ordained by the City Council of the city of Sioux City, Iowa:

SECTION 1. That all able-bodied residents of the city of Sioux City, between the ages of 21 and 45 years, not otherwise exempt by law, shall between the first day of April and the first day of September in each year, by themselves or satisfactory substitutes, perform two days' labor upon the streets, alleys and highways within the said city, at such times and such places as the street commissionor of said city shall direct, and after having been served with three days' notice in writing to perform the same.

SEC. 2. That for each day's failure to attend and perform such labor at the time and place specified, the delinquent shall forfeit and pay to the said city the sum of $3 for each day's delinquency, and in case of failure to pay such sum within ten days the said street commissioner shall bring an action in his own name as street commissioner of said city of Sioux City against said delinquent before any justice of the peace in Sioux City township, if such delinquent resides in such township, and all such forfeitures of delinquents shall be by him collected and applied as hereinafter specified. No property or wages belonging to such delinquent shall be exempt to him on execution, and the defendant shall pay all the costs of such proceedings against him. All moneys so collected shall be expended upon the streets of the city of Sioux City.

SEC. 3. The street commissioner shall notify, or cause to be notified, in writing, each and every able-bodied male resident within the city limits, not otherwise exempt by law, to attend and perform such labor at the time and place specified in such notice, and if the person so notified shall fail to attend and perform any such labor, by himself or proper substitute

BOTTOMING ROOM, THE HUISKAMP BROS. SHOE CO., KEOKUK.

at the said time and place mentioned in said notice, and pay the sum of $3 for each day's delinquency, said street commissioner shall commence action against him at the time and in the manner as hereinbefore set forth. Such notice to perform such labor shall be served in writing three days before the time therein specified as the time when such work and labor is required to be done.

SEC. 4. The fact that such notice was served, and a failure to perform such work and labor, or to pay for such delinquency, shall be all the proof required to entitle the city to a judgment for sums due for unpaid delinquency for street labor, and no defense shall be sufficient unless the defendant can show himself exempt by statute from performing such labor.

SEC. 5. All sums when recovered by said street commissioner for delinquent street labor and costs shall be turned over to the city treasurer and shall be a part of the poll tax fund of said city and be expended by said city upon its streets The street commissioner shall in all cases issue to each person a receipt for all moneys paid to him or for labor performed by any person upon the streets, alleys and highways of the city, and shall enter upon the stub of each and every receipt so issued a full memorandum showing the amount of moneys so paid or labor performed and when, and to whom issued, and which said stubs of receipt books shall be by said street commissioner preserved, and at the time of making his annual report, filed with the city auditor and thereafter kept as a part of the records of said auditor's office.

SEC. 6. No person shall be exempt from performing such labor upon said streets at the time and place specified in said notice by reason of their having performed labor upon their own motion at any other time and place in said city.

SEC 7. All sums for delinquent street labor remaining uncollected on the first day of September in each year shall be certified by said street commissioner to the city auditor, who shall forthwith certify the same to the county auditor, to be by him placed upon the tax lists of the county against the delinquent, and the same shall be treated as other taxes on property and shall be a tax lien upon the real property of said delinquent that may be listed for taxation and assessed and owned by him on the first day of November of the same year; and shall be collected by the county treasurer as other taxes are collected.

SEC. 8. In cases where judgments have been rendered for unpaid delinquent street labor and the same has not been paid on or before the first day of September in each year, the amount of said judgment with costs shall be certified to said auditor and collected as taxes as hereinbefore set forth, but the fact that the amount of said judgment has been so certified and placed upon the said tax lists shall not prevent the enforcement of said judgment by execution or otherwise.

SEC. 9. When such judgment shall be paid or recovered on execution, a certificate of such payment shall issue from the court where said judgment was rendered, directing the county treasurer to satisfy the same upon the tax lists, and such certificate shall be received and held by the said county treasurer as his voucher therefor, and be received as such money collected and turned over to the city treasurer for delinquent street labor.

In Burlington 3,000 persons are liable for the tax. In 1895, 2,136 of them either worked or paid the tax and in 1896, 2,325 came to time. It cost the city in 1895 the sum of $250 to collect the tax and in 1896, $237.75. Collectors receive $1.75 per day while employed. The collection is made directly under the state law. Delinquents are not certified to the county treasurer.

Ottumwa has a voting population of about 4,600. The tax levied is $2.50 per year. Deducting one-third, which it is safe to say is not liable from the fact that they are too old or physically not able to perform a day's labor, we would have a population that was liable for the tax of 3,067. In 1895, 1,627 paid or worked the tax and 1,440 were turned over to the county treasurer for collection. In 1896, 1,407 paid or worked the tax with 1,660 turned over for collection to the county treasurer. It was impossible to ascertain how many of those that were turned over to the county treasurer for collection paid the tax

The following from the ordinances of the city of Council Bluffs shows the method adopted for the collection of poll tax therein:

SECTION 69. The street commissioner shall, between April 1st and September 1st, in each year, require all able-bodied male residents of the city, between the ages of 21 and 45 years in person or by substitute, to perform two days' labor upon the streets, alleys and public highways, within or leading to the city, as the council may direct, and shall personally oversee the performance of such labor at such places and times as he may direct.

SEC. 70. The street commissioner or poll tax collector shall give to all persons liable for two days' work on highways, as provided herein, three days' notice of the time and place they are required to meet said street commissioner for the performance of said labor, and designate in said notice the tools or implements he is required to bring with which to labor, and each person so notified shall meet the said street commissioner at the time and place named, bringing with them the tools or implements designated, labor diligently under the direction of said commissioner eight hours each day, for which labor said commissioner shall give the proper certificate, which shall be evidence of the performance thereof. Or should the person so notified, so elect, he may commutate the same by paying to the street commissioner or poll tax collector the sum of $2 by the time designated in said notice to perform said labor; but in case he shall fail to appear and perform said labor, or pay said commutation as provided, he shall become liable to the city in the penal sum of six dollars ($6), which shall be collectible by suit as provided by law.

SEC. 75. For the purpose of securing the faithful service of the collector, one-half of all the fees shall be paid to him at the time of rendering a report at each regular meeting of the council; the other half shall be retained by the city until the expiration of his term of office, or until he has performed all his duties to the satisfaction of the council.

CUTTING ROOM, THE HUISKAMP BROS. SHOE CO., KEOKUK.

The poll tax collector receives as compensation for his services, 20 per cent of all money paid in and all worked out.

The number of persons liable for poll tax is estimated to be 2,000 or 50 per cent of the voting population. Of this 2,000 in 1895, 896 persons paid or worked out the same, the amount collected being $1,792. In 1896, 861 persons responded either with cash or work to the amount of $1,722, $2 being the amount stipulated by the ordinance to be paid per head as poll tax. The poll tax collector received for his services for 1895 the sum of $358 and for 1896 the sum of $344.

Before that time less than one-third of those liable paid the tax.

Dubuque, Cedar Rapids and Keokuk make no attempt to collect poll tax.

The total number of persons liable for poll tax in the five cities under consideration is 21,146, of which in 1895, 9,283 paid the tax and in 1896, 9,308. It will be readily seen that considerable less than 50 per cent paid the tax. A law that cannot be applied to more than 50 per cent of the people it is supposed to govern, is not a good law and ought to be repealed. In all the cities enumerated will be found old worn-out men and cripples working upon the streets as proxies, yet the law expressly stipulates that none but able-bodied men between the ages of 21 and 45 shall perform this labor. The tax is levied upon the theory that the best possible results are to be obtained, and not on the theory that it is a charity tax. There are men in many of the cities under consideration, who carry around with them certificates from physicians to the effect that they are not physically able to perform manual labor, yet they are allowed to work out some men's tax, who can not secure such certificate. This is not as it should be, and persons who pay their tax, defraud the respective cities from the fact that they have employed persons who are not competent to perform two days' labor upon highways.

For this reason and for numerous others, which are too familiar to the general public to need mention in a report of this kind, I recommend the repeal of the poll tax law.

Following will be found the revised statutes of the special session of the legislature relative to the poll tax law, page 361, annotated code of Iowa:

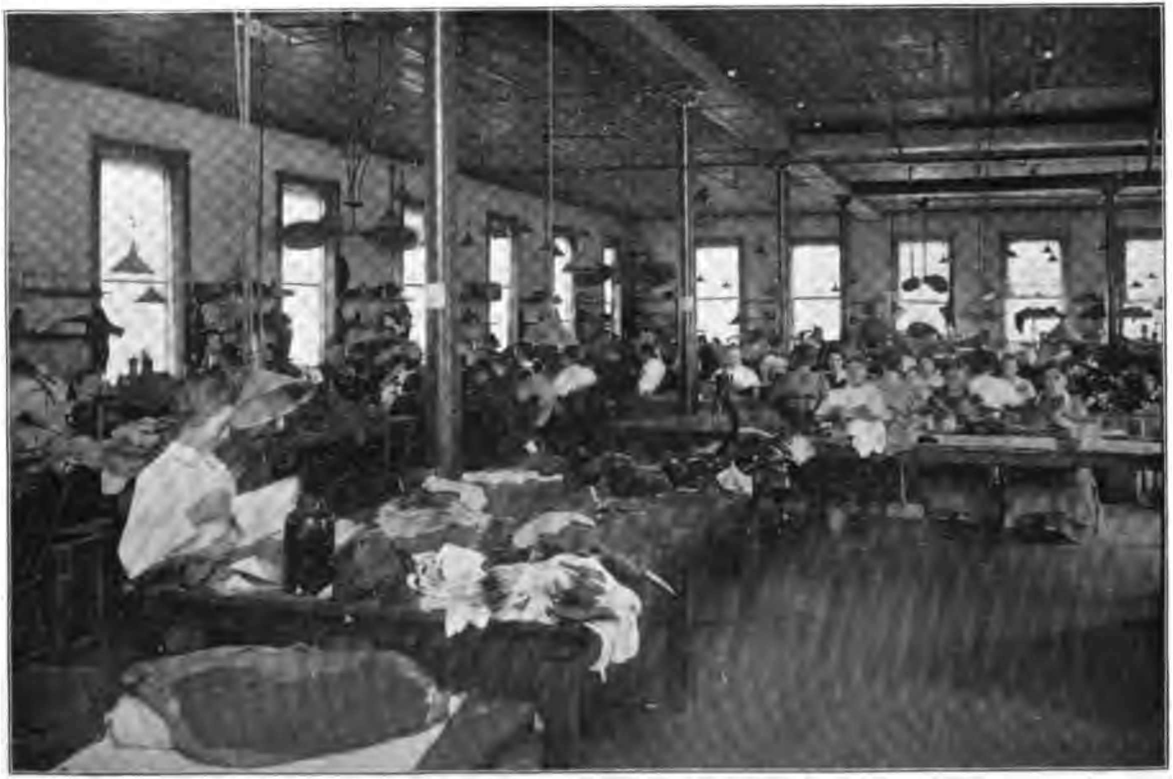
SECTION 891. *Labor on Highways.*—Any city or town shall have power to provide that all able-bodied male residents of the corporation between the ages of 21 and 45 years, between the first day of January and the first day of November of each year, either by themselves or satisfactory substitute, shall perform two days' labor of eight hours each upon the streets, avenues, alleys, highways or public grounds within such corporation, at such times and places as the proper officer may direct, upon three days' notice in writing given, or pay in lieu thereof in money a sum to be fixed by such council, not exceeding one and one-half dollars for each of such day's labor. For each day's failure to attend and perform the labor, or pay said sum of money, as required, at the time and place specified, unless excused by the supervisor of highways or street commissioner, the delinquent shall forfeit and pay the sum of two dollars, not exceeding four dollars in all. Any person excused shall be again notified to perform such labor or pay said sum of money in lieu thereof, at any time prior to September first of said year. All persons claiming to be exempt from labor under this section shall, within three days after receiving notice to perform such labor, furnish the mayor or other proper officer with an affidavit showing the extent and nature of the disabilities entitling him to such exemption. If he fails to do so he shall be liable to perform such labor or pay the penalty provided herein.

SEC. 892. *Enforcement of Road Tax.*—In case of failure to pay said sum of money in lieu of said labor, together with such forfeit, to the supervisor of highways, street commissioner, or other officer of said corporation authorized to receive the same within ten days from the expiration of the time fixed for the performance of such labor, said corporation may recover the same by action brought in the name of such city or town before the mayor of said corporation, or before any justice of the peace in the proper township. No property or wages belonging to said person shall be exempt to the defendant on an execution issued for said judgment and costs. The tax and forfeit money so collected shall be expended upon the streets, avenues, highways, alleys or public grounds of said corporation. All of such tax and forfeit money remaining unpaid on the first day of September in each year may be certified to the county auditor at any time before the following first day of December, and shall be entered by him upon the tax list of said county, and treated and collected as ordinary county taxes, and shall be a lien on all the real property of the delinquent.

SEC. 893. *Action.*—But the entry of such tax and penalty upon tax list shall not prevent an action being brought therefor as hereinbefore authorized. Such action, however, must be commenced within one year from the first day of October following the giving of notice to perform the labor. In event of judgment being rendered therefor and paid in whole or in part after the same has been certified to the county auditor, the court receiving such payment shall execute duplicate receipts, exclusive of costs, if so requested, and upon filing such receipt or duplicate with the county auditor he shall make the proper entries on the tax lists, showing the full payment of such tax and penalty, or part thereof, as the case may be.

LABOR ORGANIZATIONS.

The past two years have not shown much growth in trade and labor organizations in the state. The older and stronger organizations, while they have not grown much, have held their



FITTING ROOM, THE HUISKAMP BROS. SHOE CO., KEOKUK.

own and are coming out of the hard times in better condition than ever before. Some of the newer ones have submitted to the inevitable and suspended business for a little, but with renewed business prospects will be revived. Even at this writing many of them are reorganizing. They are getting their laws together and culling and trimming them to a better adjustment of their business and will in a little while embody all that is good, striking therefrom all that has been in any way breeders of contention and strife among their membership, thereby making their organizations stronger and better in every respect. Many a strong organization has been disrupted by its own laws. The laws have been too stringent to begin with. They have copied the laws of older organizations whose membership has been brought down and reduced to a working factor, and many members of new organizations chafe under rules they are inclined to term a little tyrannical. In the beginning they should have more latitude than old and tried organizations and the membership will gradually provide laws and adapt themselves to them that will be a lasting benefit and a credit to all concerned. They should not attempt to follow too closely the laws of older organizations, but rather to be guided by conditions surrounding them.

Great good has been accomplished by the trades and labor organizations of this state, but they are yet in their infancy, so to speak, and greater and grander things will be expected from them, and those who will follow them in the years to come will not be disappointed.

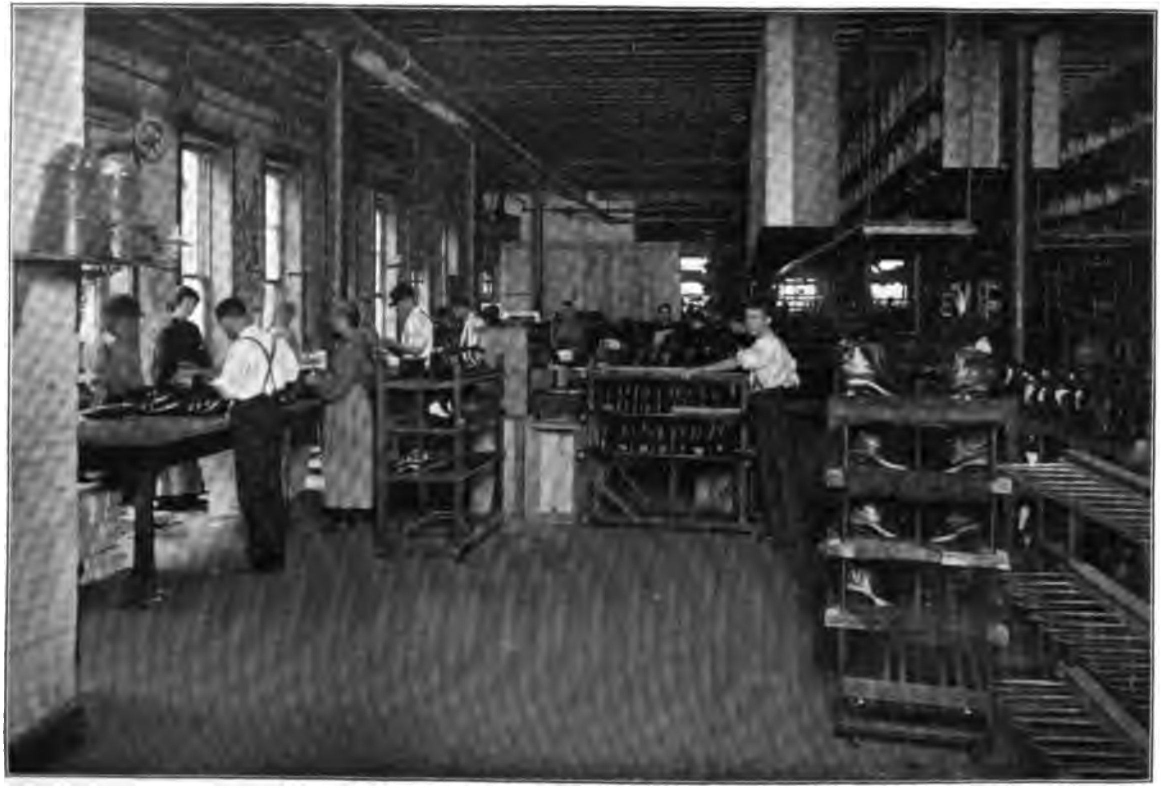
The rocks and shoals that have caused their disruption in the past have been sited and will give less trouble in the future. Better and more conservative judgment is being displayed in the selection of officers, and many are the evidences indeed that show that trades unions in the near future will wield a most powerful influence for the upliftment of mankind.

REPORTS BY COUNTIES.

In reviewing the following reports by counties and also the recapitulation of the entire state, it should be taken into consideration that the tables only include the individuals, firms and corporations employing five or more persons. A large number have filled out the blanks, which was sent them, who do not employ the number of hands set forth in the law governing this office. These reports are excluded.

As will be seen from the tables, giving the recapitulation of the entire state, the total number reporting to this office is 1,752. In connection therewith it should be remembered that about 1,500 firms, corporations and individuals have made a report showing that they employed only from two to four hands during the years 1895 and 1896, and that about 250 reported having failed or quit doing business during the same period on account of the hard times.

These facts I deem it a pleasure to mention in order to show that the manufacturers and employers of labor in our state have lent a valuable assistance toward getting out a report pertaining to the condition of labor in the state of Iowa, and that they very willingly have co-operated in the work of this office to the best of their knowledge.



PACKING ROOM, THE HUISKAMP BROS. SHOE CO., KEOKUK.

STATISTICAL TABLES.

ADAMS COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	Females.	Apprentices.	NO. EMPLOYED, 1896. Males.	Females.	Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	Short time, reduced force.	Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	Short time, reduced force.	Suspended.
1	Brick and tile manufactory	1	8	....	....	5	....	....	$ 1,800	$ 715	24	....	28	24	....	28
2	Canning vegetables	1	8	25	....	5	15	....	725	833	6	2	44	3	8	41
3	Coal mining	7	62	....	....	50	....	....	13,834	13.663	26	....	26	25	....	27
4	Hotels	1	2	8	....	2	3	....	888	828	52	....	....	52	....	....
5	Milling	1	5	....	....	5	....	....	2,000	1,972	26	....	26	26	....	26
	Total	11	85	28	....	67	18	....	$ 18,747	$ 17,511						
	Average	....	....	....	....	....	....	....	....	....	27	1	24	26	2	24

ALLAMAKEE COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	Females.	Apprentices.	NO. EMPLOYED, 1896. Males.	Females.	Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	Short time, reduced force.	Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	Short time, reduced force.	Suspended.
1	Lumber and saw mills	1	40	....	....	25	....	....	$ 11,090	$ 5,449	....	52	....	....	52	....
2	Wagon and carriage manufactories	2	21	....	....	14	....	....	6,800	6,400	42	10	....	31	21	....
	Total	3	61	....	....	39	....	....	$ 17,890	$ 11,849						
	Average	....	....	....	....	....	....	....	....	....	21	31	....	15	37	....

APPANOOSE COUNTY.

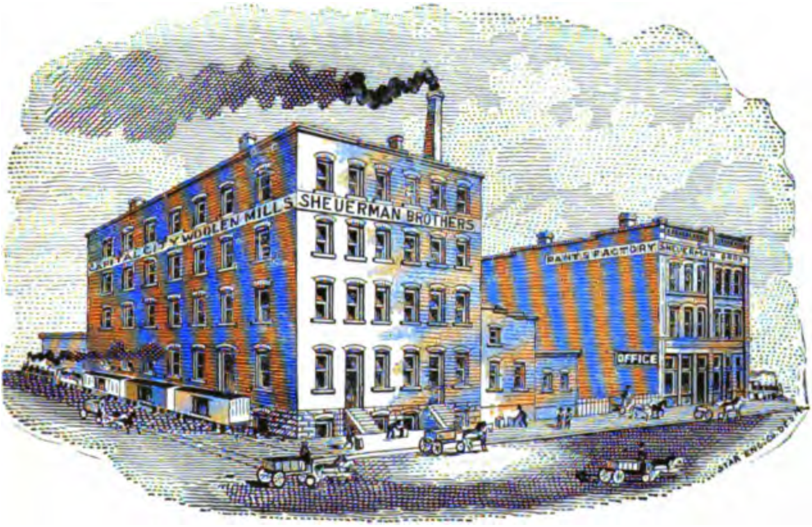
Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	Females.	Apprentices.	NO. EMPLOYED, 1896. Males.	Females.	Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	Short time, reduced force.	Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	Short time, reduced force.	Suspended.
1	Coal mining	39	2,061	....	....	1,784	....	....	$ 506,005	$ 479,686	14	25	13	13	27	12
2	Foundry and machine works	1	12	....	....	16	....	4	4,140	4,000	30	21	1	30	20	2
3	Hotel	1	6	6	....	4	8	....	3,204	2,124	52	....	....	52	....	....
4	Wholesale grocery	1	9	1	1	10	2	....	5,450	5,350	52	....	....	52	....	....
	Total	42	2,088	7	1	1,814	10	4	$ 518,799	$ 491,160						
	Average	....	....	....	....	....	....	....	....	....	37	11	3	37	12	3

BENTON COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	Females.	Apprentices.	NO. EMPLOYED, 1896. Males.	Females.	Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	Short time, reduced force.	Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	Short time, reduced force.	Suspended.
1	Brick and tile	2	21	.....	.....	19	.....	.....	$ 4,750	$ 3,815	23	4	25	7	16	29
2	General store	1	6	2	.....	6	2	.....	3,100	3,100	52	.....	.....	52	.....	.....
3	Hotel	1	3	9	.....	3	9	.....	1,700	1,700	52	.....	.....	52	.....	.....
4	Hardware and tinware manufactory	1	6	.....	1	5	.....	1	2,711	2,330	20	32	.....	20	32	.....
5	Newspaper and printing	1	5	.....	3	5	.....	3	1,743	1,730	52	.....	.....	52	.....	.....
	Total	6	41	11	4	38	11	4	$ 14,004	$ 12,675						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	40	7	5	37	9	6

BLACK HAWK COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	Females.	Apprentices.	NO. EMPLOYED, 1896. Males.	Females.	Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	Short time, reduced force.	Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	Short time, reduced force.	Suspended.
1	Brick and tile manufactory	1	9	.....	.....	9	.....	.....	$ 825	$ 247	7	21	24	2	7	43
2	Brooms and brushes	1	12	.....	4	12	.....	4	3,800	4,700	40	.....	12	44	4	4
3	Canning of vegetables	1	40	60	.....	35	65	.....	3,250	3,200	5	.....	47	5	.....	47
4	Creamery supplies, manufactories	2	34	2	3	54	4	8	17,590	28,161	48	4	.....	48	4	.....
5	Clothing manufactory	1	4	41	.....	5	35	.....	10.433	9,419	50	.....	2	44	.....	8
6	Dry goods, retail	3	13	13	.....	13	13	.....	7,763	10,280	52	.....	.....	52	.....	.....
7	Egg case fillers	2	4	21	.....	45	100	.....	5,010	18,356	14	38	.....	34	10	8
8	Hardware and plumbing	2	11	2	2	9	2	.....	7,803	6,522	52	.....	.....	52	.....	.....
9	Hotels	6	23	44	.....	25	47	.....	10,680	10,570	52	.....	.....	52	.....	.....
10	Laundry	1	4	5	.....	4	8	.....	2,600	3,640	35	17	.....	37	15	.....
11	Life insurance	1	4	1	.....	6	2	.....	5,360	9,090	52	.....	.....	52	.....	.....
12	Livery, hack and transfer	1	5	.....	.....	7	.....	.....	2,100	2,940	52	.....	.....	52	.....	.....
13	Machine shops, novelties, etc	5	123	.....	2	96	.....	1	45,142	41,405	41	2	9	44	8	.....
14	Mills, flour and feed	3	62	8	.....	64	1	.....	32,000	38,749	38	11	3	48	4	.....
15	Newspapers, printing and binding	4	37	6	5	44	8	10	16,700	23,800	50	2	.....	50	2	.....
16	Pork packers	1	24	.....	.....	21	.....	.....	13,566	11.309	52	.....	.....	52	.....	.....
17	Planing mills and wood workers	6	167	1	7	167	1	4	78,320	52,873	33	15	4	25	18	9
18	Sorghum manufactories	2	50	2	.....	47	.....	.....	2,500	1,650	4	.....	48	4	.....	48
19	Wholesale drugs	1	4	3	2	5	3	2	2,925	3,405	52	.....	.....	52	.....	.....
20	Wholesale fruits	1	10	.....	.....	11	.....	.....	4,320	5 000	52	.....	.....	52	.....	.....
21	Wholesale groceries	2	60	2	.....	63	2	.....	38,708	50,600	52	.....	.....	52	.....	.....
	Total	47	700	211	25	742	291	24	$ 311,395	$ 335,916						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	38	6	8	39	3	10



**EIGHTH AND VINE TO EIGHTH AND MARKET STREETS,
DES MOINES, IOWA.**

BOONE COUNTY.

	Brick and tile manufactories	2	18	.....	.....	24	.....	.....	$ 2,000	$ 3,375	4	20	28	18	4	30
2	Book binding and printing	1	8	3	3	10	2	2	4,628	4,880	50	2	.....	50	2	.....
3	Coal mining	11	1,097	.....	.....	941	.....	.....	396,307	304,415	19	14	19	22	14	16
4	Dry goods, retail	1	3	5	.....	8	5	.....	3,785	3,845	52	.....	.....	52	.....	.....
5	Hardware and implements	1	6	.....	.....	6	.....	.....	4,069	4,420	52	.....	.....	52	.....	.....
6	Hotels	2	16	25	.....	11	17	.....	5,530	4,920	33	.....	19	52	.....	.....
7	Laundries	1	2	6	.....	2	7	.....	1,922	2,221	52	.....	.....	52	.....	.....
8	Merchant tailoring	1	8	.....	.....	9	.....	.....	8,324	8,372	52	.....	.....	52	.....	.....
9	Milling and grain	1	10	1	.....	11	1	.....	5,700	6,500	52	.....	.....	52	.....	.....
10	Street railway, electric	1	10	.....	.....	10	.....	.....	5,520	5,625	52	.....	.....	52	.....	.....
11	Wholesale leather and saddlery	1	20	.....	3	12	6	2	7,000	9,644	40	12	.....	.....	52	.....
	Total	23	1,198	40	6	1,039	38	4	$ 439,785	$ 353,217						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	42	4	6	41	7	4

BREMER COUNTY.

1	Creamery supplies	1	15	.....	4	16	.....	3	$ 5,200	$ 6,400	40	12	.....	40	12	.....
2	Furniture, retail	1	8	.....	.....	8	.....	.....	2,234	2,234	26	26	.....	26	26	.....
3	Hotels	1	5	7	.....	7	8	.....	3,016	4,000	52	.....	.....	52	.....	.....
	Total	3	28	7	4	31	8	3	$ 10,450	$ 12,634						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	39	13	.....	39	13	.....

BUCHANAN COUNTY.

1	Cold storage	1	12	.....	.....	12	.....	.....	$ 4,852	$ 2,949	40	12	.....	35	17	.....
2	Hotels and restaurants	2	7	18	.....	7	18	.....	5,340	5,340	52	.....	.....	52	.....	.....
3	Machine shops and foundries	2	15	.....	.....	18	.....	.....	4,550	4,550	34	11	7	34	7	11
4	Medicine, patent	1	6	1	.....	.....	.....	.....	2,540	.....	45	7	.....	.....	52	.....
5	Milling, grain	1	5	.....	.....	6	.....	.....	2,840	3,500	52	.....	.....	40	12	.....
6	Planing mill	1	12	1	2	14	1	3	5,000	4,000	32	20	.....	26	26	.....
7	Street railway, electric	1	6	.....	.....	6	.....	.....	2,940	2,780	52	.....	.....	52	.....	.....
8	Wholesale grocery	1	.....	.....	.....	6	.....	.....	.....	4,740	.....	.....	52	52	.....	.....
	Total	10	63	20	2	64	19	3	$ 28,062	$ 27,859						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	38	6	8	36	14	2

BUENA VISTA COUNTY.

1	General merchandise	2	12	1	.....	12	1	.....	$ 4,858	$ 4,696	52	.....	.....	52	.....	.....
2	Hotel	1	4	8	.....	4	7	.....	2,300	1,980	52	.....	.....	52	.....	.....
	Total	3	16	9	.....	16	8	.....	$ 7,158	$ 6,676						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	52	.....	.....	52	.....	.....

CALHOUN COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Hotel	1	2	7	.....	1	5	.....	$ 952	$ 400	52	......	.....	52	......	......
	Total	1	2	7	.....	1	5	.....	$ 952	$ 400						
	Average	.....	.....	.....		.....	.....	.....	....	....	52	.....	......	52	... ..	......

CARROLL COUNTY.

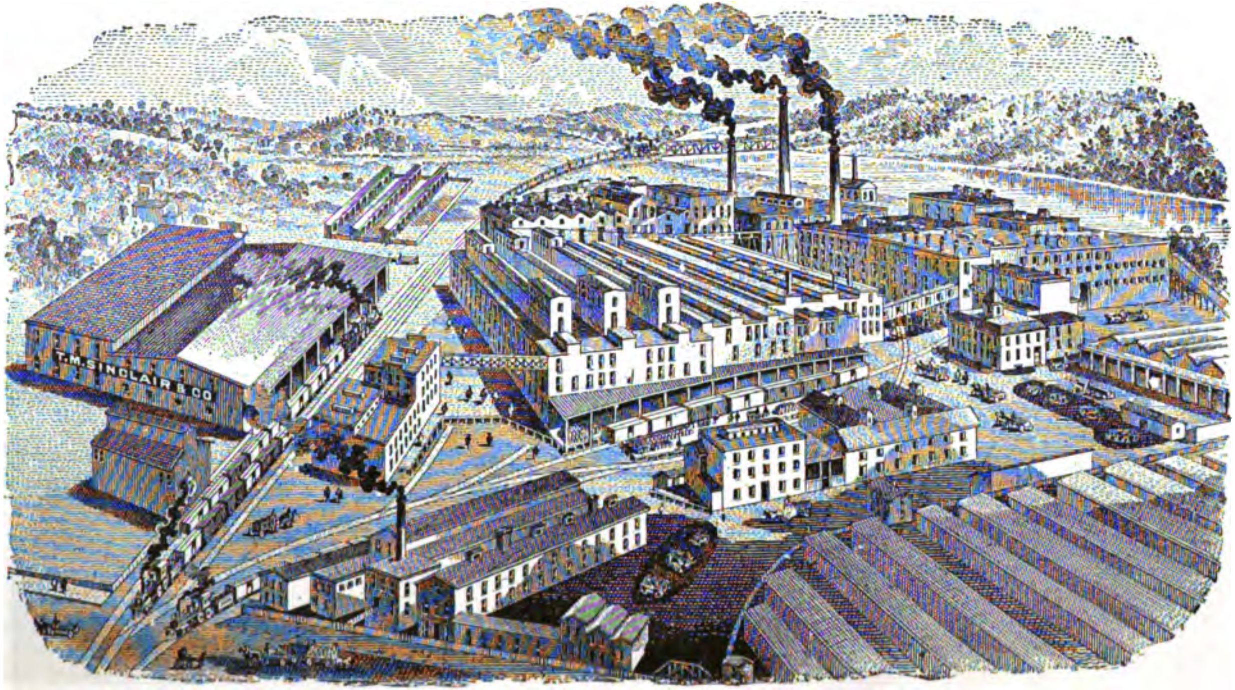
Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Hotels	2	6	17	.....	6	18	.....	$ 4,935	$ 4,985	52	......	.....	52	......	......
2	Wholesale groceries	1	10	2	.....	10	2	.....	9,100	12,900	52	......	.....	52	......	.....
	Total	3	16	19	.. ..	16	20	.....	$ 14,035	$ 17,885						
	Average	...	.....	.....	.....	.....	.....	.....	....	....	52	......	......	52	......	......

CASS COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Brick manufactories	2	13	.....	...	17	....	.....	$ 1,158	$ 2,094	8	2	42	11	1	40
2	Canning vegetables	1	270	130	.....	150	150	.....	11,000	9.358	10	30	12	8	26	18
3	Foundry and machine shop	1	8	.....	.....	7	.....	.....	5,200	2,184	39	13	......	33	16	4
4	General merchandise	2	14	8	....	14	8	.....	7,965	7,871	52	.....	......	52	....	......
5	Hotels	2	10	12	.....	10	12	.....	4,248	4,248	52	.....	....	52	....	......
6	Merchant tailoring	1	8	2	.....	8	2	.....	4,960	4,450	52	......	......	52	......	......
7	Newspapers, printing and book binding	2	18	3	1	18	3	1	5.800	7,000	52	......	....	52	......	......
8	Water works and electric power	1	6	.....	.....	.....	.....	.....	3,900	....	52	......	......	......	52	......
	Total	12	347	155	1	224	175	1	$ 44,231	$ 37,205						
	Average	.....	.....	.....	.....	.....	.....	.....	....	....	39	6	7	33	12	8

CEDAR COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Brick and tile	2	30	.....	.....	22	.....	.....	$ 5,500	$ 2,890	22	......	30	12	4	36
2	General merchandise	1	9	.....	.....	......	.....	.....	4,200	....	52	......	......	......	52	......
3	Lime manufactory	1	22	.....	.....	16	.....	.....	6,467	5,530	35	17	.....	43	9	.....
	Total	4	61	.....	.....	38	.....	... .	$ 16,167	$ 8,420						
	Average	.....	...	....	.. .	.....	.....	.....	....	....	36	6	10	18	22	12



M. T. SINCLAIR & CO.'S PACKING HOUSE CEDAR RAPIDS.

CERRO GORDO COUNTY.

1	Bottling and manufacturer of temper'e drinks	1	12	....	....	8	....	....	$ 2,394	$ 2,314	36	16	....	30	22	....
2	Brick and tile manufactory	1	30	....	....	30	....	....	14,468	11,388	52	....	....	36	8	8
3	Carriage and wagon manufactory	1	5	....	....	5	....	....	2,500	2,500	30	22	....	....	52	....
4	Dry goods, retail	2	6	12	....	7	12	1	5,200	5,600	52	....	....	52	....	....
5	Electric light	1	....	....	....	7	1	....	....	4,800	....	....	....	52	....	....
6	General merchandise	1	....	....	....	4	8	2	....	2,000		....		52	....	....
7	Hotels	4	14	40	....	14	40	....	6,989	8,732	34	1	17	42	....	10
8	Laundries	2	6	19	....	11	26	....	7,500	8,600	52	....	....	39	....	13
9	Machine shop and foundry	1	12	....	....	5	....	....	3,530	3,000	34	18	....	42	10	....
10	Newspapers and printing	2	16	5	1	17	6	....	5,500	8,000	52	....	....	52	....	....
11	Wholesale coal	1	14	2	....	14	2	....	7,000	7,000	52	....	....	52	....	....
12	Wholesale eggs and butter	1	7	....	....	6	....	....	4,160	3,536	52	....	....	52	....	....
13	Wholesale groceries	1	16	3	....	16	3	....	14,819	15,000	52	....	....	52	....	....
14	Quarries, stone	1	8	....	....	....	....	....	3,122	....	32	20	....	....	52	....
	Total	20	146	81	1	144	98	3	$ 77,182	$ 82,470						
	Average	....	....	....	....	....	....	....	....	....	44	7	1	40	10	2

CHEROKEE COUNTY.

1	Brick and tile manufactory	1	51	....	....	65	....	....	$ 3,025	$ 2,504	....	26	26	....	26	26
2	Hotels	3	10	18	....	9	20	....	5,030	3,011	....	49	3	52	....	....
	Total	4	61	18	....	74	20	....	$ 8,055	$ 5,515						
	Average	....	....	....	....	....	....	....	....	....	....	37	15	26	13	13

CHICKASAW COUNTY.

1	Hotel	1	3	11	...	3	11	....	$ 2,036	$ 2,500	52	....	....	52	....	....
	Total	1	3	11	..	3	11	....	$ 2,036	$ 2,500						
	Average	....	...	....	....	....	....	....	....	....	52	....	....	52	....	....

CLARKE COUNTY.

1	Hotel	1	8	10	....	8	10	....	$ 1,644	$ 2,062	52	....	....	52	....	....
2	Plow manufactory	1	7	....	....	5	1	....	1,500	1,400	26	21	5	26	13	13
	Total	2	15	10	....	13	11	....	$ 3,144	$ 3,462						
	Average	....	....	....	....	....	....	....	....	....	39	10	3	39	6	7

CLAY COUNTY.

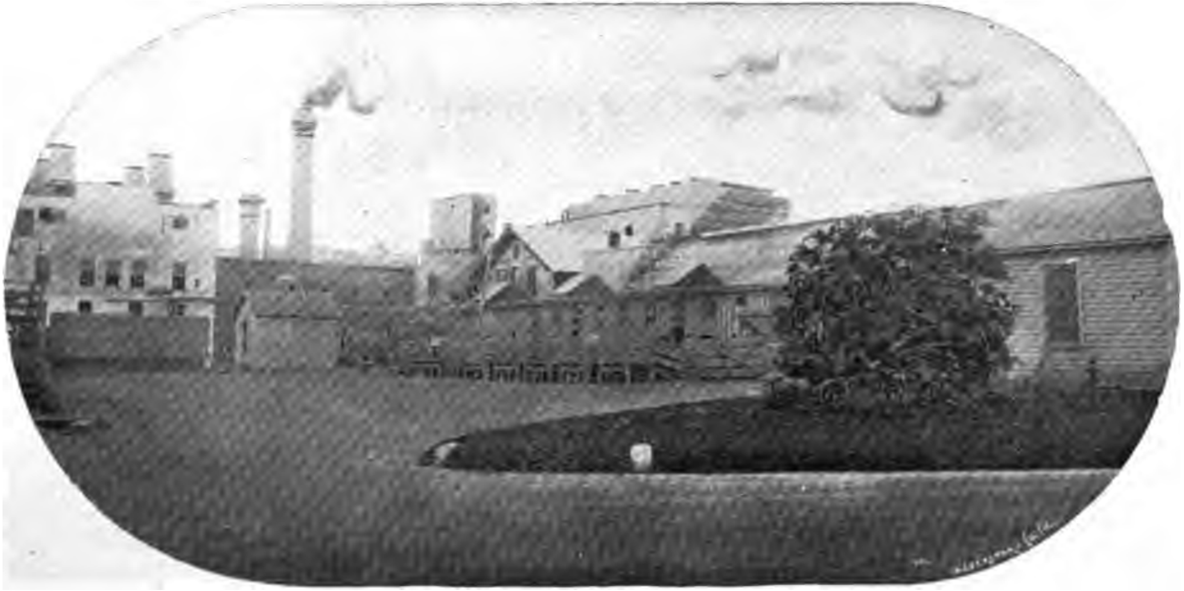
1	Grain, hay, feed and milling	1	15	1	....	47	....	....	$ 12,756	$ 30,360	52	....	....	52	....	....
	Total	1	15	1	....	47	....	....	$ 12,756	$ 30,360						
	Average	....	....	....	....	....	....	....	....	....	52	....	....	52	....	....

CLAYTON COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895.			NO. EMPLOYED, 1896.			Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895.			NO. WEEKS IN OPERATION, 1896.		
			Males.	Females.	Apprentices.	Males.	Females.	Apprentices.			Full time, full force.	Short time, reduced force.	Suspended.	Full time, full force.	Short time, reduced force.	Suspended.
1	Brick manufactory	1	8	.....	.....	9	.....	.....	$ 2,000	$ 945	30	......	22	11	.....	41
2	Foundry and machine shop	1	8	.....	.....	......	.....	.....	518	....	19	27	6	......	......	......
3	Hardwood lumber manufactory	1	7	.....	.....	6	.....	.....	2,657	2,100	26	......	26	16	......	36
4	Newspaper, printing and binding	1	12	4	.....	3	3	2	3,000	2,000	52	......	......	49	......	3
5	Saw mill and lumber yard	1	110	.....	.....	150	....	.....	49,000	35,000	28	24	......	28	24	......
	Total	5	135	4	....	168	3	2	$ 57,175	$ 40,045						
	Average	.....	....	.....	.....	....	.....	.....	....	....	31	10	11	26	6	20

CLINTON COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895.			NO. EMPLOYED, 1896.			Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895.			NO. WEEKS IN OPERATION, 1896.		
			Males.	Females.	Apprentices.	Males.	Females.	Apprentices.			Full time, full force.	Short time, reduced force.	Suspended.	Full time, full force.	Short time, reduced force.	Suspended.
1	Beer manufactories	2	17	.....	.....	17	.....	.....	$ 8,672	$ 9,300	52	......	......	52	.....	......
2	Boiler maker	1	20	.....	5	20	.....	4	8,000	8,000	30	22	......	30	22	......
3	Bottler	1	8	.....	.....	6	.....	.....	5,550	3,500	52	......	......	52	......	......
4	Box manufactories	3	90	.....	.....	89	.....	.....	22,131	19,564	17	34	1	15	35	2
5	Brick manufactory	1	8	.....	.....	8	.....	.....	2,009	1,218	30	......	22	9	12	31
6	Clothing, retail	2	11	.....	.....	11	.....	.....	6,220	6,820	52	......	.....	52	......	......
7	Coal, wood and flour, retail	2	9	1	.....	9	1	.....	4,900	4,900	52	......	......	52	......	......
8	Cracker manufactory	1	16	9	.....	17	10	.....	15,725	15,005	48	....	4	47	.....	5
9	Dry goods, retail	4	20	22	1	23	24	.....	28,933	26,442	52	...	......	52	.....	......
10	Foundry and machine shops	2	39	.....	.....	79	.....	.....	25,192	34,315	49	3	......	51	1	......
11	Furniture manufactories	4	154	29	.....	162	23	5	50,595	49,885	29	19	4	7	41	4
12	Gas and electric lights	1	20	.....	.....	21	.....	.....	12,000	13,000	52	......	......	52	......	......
13	Hotels and restaurants	3	4	5	.....	15	22	.....	1,580	5,885	17	18	17	52	......	......
14	Kindling wood factory	1	23	3	.....	23	3	.....	3,000	2,148	13	36	3	13	32	7
15	Laundry	1	5	15	.....	5	20	.....	4,500	5,000	36	16	......	36	16	......
16	Lime manufactories	2	25	.....	....	6	.....	.....	9,539	875	28	13	11	8	......	44
17	Lumber, retail	1	28	.....	.....	5	1	....	10,340	7,447	......	52	......	52	......	......
18	Merchant tailor	1	4	3	....	4	1	3	935	772	40	12	......	26	26	......
19	Metal cornice manufactory	1	5	.....	1	6	.....	.....	2,000	2,500	30	......	22	40	12	......
20	Millinery	2	6	12	.....	6	18	3	7,000	7,580	17	35	......	30	22	......
21	Milling, grain and flour	2	13	1	.....	14	1	.....	7,725	8,010	48	......	4	46	8	8
22	Newspapers, printing and binding	3	56	12	6	49	10	5	28,621	26,797	52	......	......	52	......	......
23	Paper manufactory	1	25	8	.....	20	4	.....	7,000	8,840	......	40	12	45	5	2
24	Pork packing	1	75	.....	.....	......	.....	.....	26,169	....	......	40	12	......	......	52



T. M. SINCLAIR & CO.'S PACKING HOUSES, CEDAR RAPIDS.

25	Saddlery manufactory	1	18	.....	2	18	.....	1	5,519	6,770	22	16	14	41	8	8
26	Sash, door and blind manufactories	2	311	.....	.....	313	.....	.....	133,548	124,680	25	24	8	16	36	8
27	Saw mills	2	920	.....	.....	919	1	.....	336,013	277,214	28	26	.....	34	18	.....
28	Street railway, electric	1	35	.....	.....	30	.....	.....	12,091	11,536	52	.....	.....	52	.....	.....
29	Telephone	1	3	4	.....	7	5	.....	4,080	7,000	52	.....	.....	52	.....	.....
30	Wholesale house, cigars	1	.....	.....	.....	6	.....	.....	.....	7,120	.....	.....	.....	52	.....	.....
31	Wholesale house, crockery	1	.....	.....	.....	8	.....	.....	.....	8,300	.....	.....	.....	52	.....	.....
32	Wholesale house, drugs	1	25	.....	.....	25	.....	.....	31,589	32,958	52	.....	.....	52	.....	.....
33	Wholesale house, fruits	1	5	.....	.....	5	.....	.....	2,905	2,757	52	.....	.....	52	.....	.....
34	Wholesale house, groceries	1	8	.....	.....	8	.....	.....	11,348	10,936	52	.....	.....	52	.....	.....
35	Wholesale houses, hardware	2	24	2	.....	25	2	.....	14,260	15,060	52	.....	.....	52	.....	.....
	Total	57	2,030	121	15	1,979	146	21	$ 849,684	$ 766,184						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	34	14	4	37	10	5

CRAWFORD COUNTY.

1	Brick manufactory	1	10	.....	.....	12	.....	.....	$ 2,000	$ 2,300	22	.....	30	20	.....	32
2	Hotels	2	3	11	.....	3	11	.....	2,908	2,752	52	.....	.....	52	.....	.....
	Total	3	13	11	.....	15	11	.....	$ 4,908	$ 5,052						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	37	.....	15	36	.....	16

DALLAS COUNTY.

1	Brick and tile manufactories	5	38	.....	.....	60	.....	.....	$ 5,680	$ 10,568	21	14	17	15	18	19
2	Coal mining	3	35	.....	.....	55	.....	.....	12,275	17,104	26	.....	26	26	6	19
3	Milling, grain	2	5	.....	.....	11	.....	.....	2,600	4,920	26	26	.....	33	18	1
4	Newspaper and printing	1	4	2	.....	2	2	1	2,808	1,150	52	.....	.....	52	.....	.....
	Total	11	82	2	.....	128	2	1	$ 23,363	$ 33,742						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	31	10	11	32	10	10

DELAWARE COUNTY.

1	Carriage and wagon manufactory	1	20	.....	.....	15	.....	.....	$ 7,200	$ 5,283	40	12	.....	34	18	.....
2	Cigar manufactory	1	10	2	.....	8	2	.....	7,000	7,500	50	.....	2	50	2	.....
3	Newspaper and printing	1	5	.....	1	5	.....	1	1,350	1.350	40	12	.....	40	12	.....
4	Woolen goods manufactory	1	7	7	.....	7	7	.....	3,000	3,193	40	.....	12	33	.....	19
	Total	4	42	9	1	35	9	1	$ 18,550	$ 17,329						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	42	6	4	39	8	5

DES MOINES COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895.			NO. EMPLOYED, 1896.			Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895.			NO. WEEKS IN OPERATION, 1896.		
			Males.	Females.	Apprentices.	Males.	Females.	Apprentices.			Full time, full force.	Short time, reduced force	Suspended.	Full time, full force.	Short time, reduced force.	Suspended.
1	Basket manufactory	1	30	45	....	45	35	....	$ 15,000	$ 11,050	25	20	7	34	8	10
2	Beer manufactory	1	6	....	....	6	....	....	3,600	3,600	52	.	....	52	....	..
3	Box (wood) manufactory	1	25	....	3	....	....	....	10,800	....	32	16	4	....	....	52
4	Box (paper) manufactory	1	....	....	....	1	7	....	....	1,100	....	....	....	36	8	8
5	Brick manufactory	1	42	....	....	42	....	....	10,896	7,084	24	20	8	20	..	32
6	Broom manufactory	1	20	....	5	18	....	5	6,000	5,000	40	12	....	37	15	....
7	Canning, vegetables	1	20	40	....	20	40	....	2,550	2,233	9	....	43	9	....	43
8	Cigar manufactories	3	42	....	6	38	....	....	19,950	17,800	51	....	1	34	....	18
9	Clothing, retail	2	24	1	....	24	1	....	9,667	9,695	52	....	....	52	....	....
10	Coffin and casket manufactory	1	34	10	....	28	7	....	20,265	15,942	30	22	....	23	29	....
11	Contractors and builders	1	27	....	....	33	....	....	7,192	3,027	22	....	30	16	....	36
12	Cooperage	2	21	....	....	17	....	....	8,640	7,500	36	16	..	34	16	2
13	Cracker and candy manufactories	2	60	37	6	46	38	6	32,701	27,627	31	14	7	30	15	7
14	Crockery, retail and wholesale	1	4	6	....	3	5	....	1,800	1,292	4	48	....	4	48	....
15	Drugs, wholesale	1	22	1	....	18	2	....	18,000	14,000	52	....	....	52	....	....
16	Drugs, retail	1	5	....	....	6	....	2	2,000	2,500	52	....	....	52	....	....
17	Dry goods, wholesale	1	7	1	....	9	1	....	6,817	6,800	52	....	....	52	....	....
18	Dry goods, retail	4	41	14	....	47	24	....	26,672	34,024	52	....	....	50	....	2
19	Fire insurance	1	4	1	....	4	2	....	4,140	5,340	52	....	....	52	....	....
20	Foundry, machine and boiler works	1	200	1	28	228	1	27	99,414	107,438	52	....	....	52	....	....
21	Furniture manufactories	4	146	....	9	130	....	....	60,324	45,140	23	24	5	18	29	10
22	Furniture, wholesale	1	63	5	....	62	5	....	22,695	18,474	32	20	....	32	20	....
23	Furniture, retail	1	....	....	....	4	1	....	....	4,801	....	....	....	52	....	....
24	Gas manufactory	1	30	....	....	142	....	....	6,854	18,863	52	....	....	52	....	....
25	Hotels	2	15	18	....	19	15	....	8,028	7,464	52	....	....	52	....	....
26	Ice manufactory	1	19	....	....	20	....	....	7,500	8,000	34	18	....	34	18	....
27	Laundries	2	10	19	....	11	17	....	9,815	8,964	52	....	....	36	16	....
28	Linseed oil manufactory	1	20	....	....	20	....	....	9,496	9,698	33	19	....	34	18	....
29	Merchant tailoring	1	12	....	....	10	....	....	6,324	5,278	26	24	....	26	26	....
30	Milling, grain and feed	2	25	....	....	25	....	....	10,181	10,201	41	11	....	39	18	....
31	Mineral water manufactories	2	12	....	....	11	....	....	3,601	4,301	27	25	....	30	23	....
32	Newspapers, printing and binding	6	81	11	12	102	12	19	60,631	79,695	48	4	....	42	3	7
33	Plumbing and steam heating	3	19	....	4	18	....	4	12,810	11,364	47	5	....	47	5	....
34	Pork and beef packers	2	25	....	3	25	....	3	14,143	12,968	22	30	....	22	30	....
35	Poultry	1	30	....	....	35	....	....	11,200	12,100	40	....	12	40	....	12

36	Sash, doors, blinds and lumber mills	6	457	.....	.....	538	.....	.....	179,395	164,034	31	15	6	27	20	5
37	Soap manufactories	1	11	2	.....	12	2	.....	5,288	6,500	45	7	.....	45	5	2
38	Shirts and overall manufactory	1	5	42	.....	3	37	.....	10,615	6,226	45	7	.....	32	18	2
39	Shoe manufactory	1	6	10	.....	6	9	.....	4,403	3,683	41	8	3	41	8	3
40	Telephone operator	1	3	5	.....	3	5	.....	2,742	4,041	52	.....	.....	52	.....	.....
41	Vinegar and pickle manufactory	1	15	20	.....	15	20	.....	15,070	7,818	48	4	.....	40	9	3
42	Wagon and carriage manufactories	3	150	.....	.....	121	.....	.....	78,661	58,609	39	11	2	20	22	10
43	Waterworks	1	.....	.....	.....	18	.....	.....	.....	9,000	52	.....	.....	52	.....	.....
44	Wholesale fruits	2	28	2	.....	28	8	.....	14,700	16,240	52	.....	.....	52	.....	.....
45	Wholesale groceries	3	70	3	.....	68	8	.....	49 263	49,498	52	.....	.....	52	.....	.....
46	Wholesale hardware	3	51	3	.....	42	3	.....	33,240	34,225	52	.....	.....	52	.....	.....
47	Wholesale leather and saddlery	1	40	1	4	39	1	3	15,000	15,000	52	.....	.....	52	.....	.....
48	Wholesale millinery	1	5	5	.....	5	5	.....	5,300	5,450	46	6	.....	46	6	.....
	Total	83	1,982	303	80	2,160	306	69	$ 963,583	$ 920,708						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	41	9	2	38	9	5

DICKINSON COUNTY.

1	Hotels	2	52	61	.....	69	70	.....	$ 5,288	$ 5,670	17	8	32	17	16	19
	Total	2	52	61	.....	69	70	.....	$ 5,288	$ 5,670						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	17	8	32	17	16	19

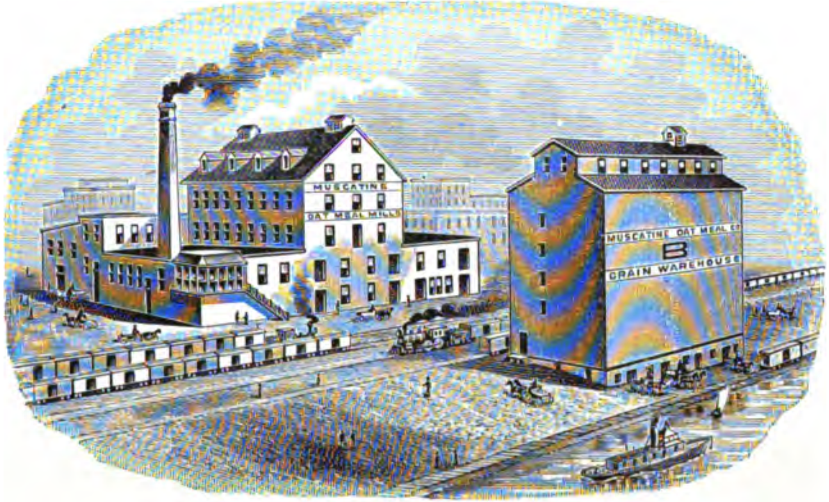
DUBUQUE COUNTY.

1	Agricultural implement manufactory	1	50	.....	.....	.....	.....	.....	$ 11,933	.....	26	.....	26	.....	.....	52
2	Bakers	2	19	4	2	18	4	2	10,656	$ 11,430	52	.....	.....	52	.....	.....
3	Baskets and lye manufactory	1	17	3	.....	15	3	.....	2,836	4,860	20	8	24	30	20	2
4	Beer manufactories	2	70	.....	.....	74	.....	.....	48,558	46,824	52	.....	.....	26	12	14
5	Blacksmiths, horseshoeing	1	6	.....	.....	6	.....	.....	2,912	2,850	52	.....	.....	52	.....	.....
6	Books, stationery, etc., retail	1	7	.....	.....	7	.....	.....	2,820	3,150	52	.....	.....	52	.....	.....
7	Books, stationary, etc., wholesale	1	14	1	.....	12	1	.....	9,500	4,100	52	.....	.....	52	.....	.....
8	Box (paper) manufactory	1	3	5	1	2	5	2	1,417	861	40	12	.....	20	32	.....
9	Brass goods manufactory	1	74	1	.....	70	.....	.....	20,648	12,760	.....	46	6	.....	52	.....
10	Brick manufactories	4	99	.....	.....	68	.....	.....	26,201	12,689	33	.....	19	15	6	31
11	Broom manufactory	1	13	2	6	13	2	6	6,400	6,120	42	8	2	36	16	.....
12	Cigar and tobacco manufactories	2	26	.....	.....	13	40	30	17,098	19,125	46	.....	6	46	.....	6
13	Cigars and tobacco, wholesale	2	28	10	.....	28	9	.....	28,203	27,778	52	.....	.....	52	.....	.....
14	Clothing, retail	1	9	1	.....	6	1	.....	6,261	4,632	52	.....	.....	52	.....	.....
15	Clothing manufactories	4	129	618	.....	98	499	.....	209,856	158,190	37	14	1	29	23	.....
16	Coffin and casket manufactories	2	101	5	2	75	10	3	37,585	42,555	51	.....	1	51	.....	1
17	Contractor and builder	1	16	.....	.....	12	.....	.....	5,670	4,320	.....	52	.....	.....	52	.....
18	Cooperage	1	20	.....	.....	25	.....	.....	1,010	7,442	8	.....	44	45	2	5
19	Confectionery manufactory	1	16	29	.....	20	25	.....	10,000	10,000	50	.....	2	50	.....	2
20	Cracker manufactory	1	20	8	.....	19	8	.....	12,837	13,822	20	32	.....	11	41	.....
21	Crockery, retail and wholesale	1	14	2	2	15	3	2	12,205	11,941	52	.....	.....	52	.....	.....
22	Drugs, retail and wholesale	1	17	.....	2	18	.....	2	12,588	13,466	52	.....	.....	52	.....	.....

DUBUQUE COUNTY—CONTINUED.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
23	Dry goods, retail	6	39	66	.....	39	76	.....	$ 37,771	$ 42,209	52	.....	.....	52	.....	.....
24	Foundry and machine shops	3	53	2	4	44	1	3	29,660	25,857	32	19	1	22	13	17
25	Furniture manufactories	2	95	.....	4	93	.....	1	33,407	31,473	26	24	2	37	12	3
26	Gas manufactory	1	10	.....	.....	9	.....	.....	7,325	11,002	52	.....	.....	52	.....	.....
27	Harness and saddle manufactories	2	25	1	.....	11	1	1	10,826	4,476	35	17	.....	22	28	2
28	Hotels	5	50	79	.....	53	79	.....	32,663	32,328	52	.....	.....	52	.....	.....
29	Laundries	5	13	31	.....	11	36	.....	12,790	12,805	28	4	10	33	14	5
30	Linseed oil manufactory	1	22	.....	.....	20	.....	.....	5,307	1,045	25	.....	27	8	1	43
31	Lime manufactory	1	16	.....	.....	8	.....	.....	5,120	2,800	40	.....	12	.....	36	16
32	Livery and transfer lines	2	34	.....	.....	35	.....	.....	16,513	16,139	52	.....	.....	52	.....	.....
33	Mattresses, cot and spring manufactory	1	25	5	.....	25	5	.....	12,052	11,521	39	13	.....	30	22	.....
34	Merchant tailors	3	33	8	.....	25	6	.....	14,934	11,635	26	26	.....	27	25	.....
35	Milling, grain and feed	3	39	1	4	29	1	.....	21,100	15,290	44	4	4	31	17	4
36	Newspapers, printing and binding	7	161	22	22	170	20	18	88,591	91,085	52	.....	.....	50	2	.....
37	Novelty, iron, hardware and specialty manfs	4	343	14	10	210	15	4	140,182	100,036	42	5	5	18	32	2
38	Painter and decorator	1	34	1	2	22	1	2	12,785	10,032	44	8	.....	44	8	.....
39	Plumbers and steamfitters	2	28	1	.....	20	1	.....	17,168	9,128	52	.....	.....	32	20	.....
40	Pumps (iron and wood) manufactory	1	50	.....	4	34	1	2	25,081	17,220	40	12	.....	.....	52	.....
41	Sash, door, blind, lumber, etc., manufactories	6	881	.....	.....	842	.....	.....	296,084	261,431	27	23	2	21	28	3
42	Sheet metal manufactory	1	22	.....	1	15	.....	1	7,260	6,750	35	17	.....	38	14	.....
43	Soap manufactory	1	15	6	.....	12	6	.....	8,813	5,767	44	8	.....	44	8	.....
44	Sodawater manufactory	1	7	.....	.....	7	.....	.....	2,840	2,840	26	26	.....	26	26	.....
45	Shoe and boot manufactories	2	46	22	2	27	13	.....	14,324	14,000	31	4	17	24	2	26
46	Shoes and boots, wholesale	2	20	1	.....	22	1	.....	25,576	25,726	52	.....	.....	52	.....	.....
47	Steam boiler manufactory	1	10	.....	.....	10	.....	.....	3,000	2,202	52	.....	.....	20	32	.....
48	Stove and roofing manufactory	1	8	.....	.....	6	.....	.....	3,745	3,321	40	12	.....	43	9	.....
49	Street car and electric light and power	3	108	1	.....	92	1	.....	47,038	44,665	39	13	.....	52	.....	.....
50	Telephone operator	1	4	10	.....	4	10	.....	4,216	4,612	52	.....	.....	52	.....	.....
51	Vinegar and pickle manufactory	1	14	1	.....	9	1	.....	9,271	7,467	52	.....	.....	52	.....	.....
52	Wagon and carriage manufactories	4	683	.....	2	585	.....	2	86,434	49,427	37	13	2	23	26	3
53	Water works	1	12	.....	.....	14	.....	.....	14,377	10,919	26	26	.....	26	26	.....
54	Wholesale fruits	3	26	3	.....	28	3	.....	17,829	16,814	52	.....	.....	52	.....	.....
55	Wholesale groceries	4	81	7	.....	79	7	.....	92,035	79,582	52	.....	.....	52	.....	.....
56	Wholesale hardware	3	50	6	.....	52	6	.....	53,860	48,682	52	.....	.....	52	.....	.....
57	Wholesale liquors	1	5	.....	.....	5	.....	.....	4,860	4,860	52	.....	.....	52	.....	.....

FRIENDS
OATS
DOES THEE EAT FRIENDS' OATS



MUSCATINE OAT MEAL MILLS, MUSCATINE.

58	Wholesale meats	2	12	....	....	13	....	....	9,250	9,500	52	....	....	52	....	....
59	Wholesale rubber goods	1	6	1	....	7	1	....	6,471	6,225	52	....	....	52	....	....
60	Wholesale salt and cement	1	64	1	....	54	1	....	26,364	24,595	52	....	....	52	....	....
61	Wholesale spice and coffee	1	9	2	....	14	....	....	6,500	11,578	52	....	....	52	....	....
62	Wholesale wire works	1	6	....	....	....	....	....	8,000	....	52	....	....	....	....	52
63	Woodenware manufactory	1	70	....	15	73	....	16	22,921	19,642	34	5	13	24	24	4
	Total	126	3,999	981	85	3,442	908	97	$ 1,786,077	$ 1,520,141						
	Average	....	....	....	....	....	....	....	....	....	41	7	4	37	10	5

EMMET COUNTY.

1	Hotel	1	3	8	....	3	8	....	$ 1,632	$ 2,276	52	....	....	52	....	....
	Total	1	3	8	....	3	8	....	$ 1,632	$ 2,276						
	Average	....	....	....	....	....	....	....	....	....	52	....	....	52	....	....

FAYETTE COUNTY.

1	Canning vegetables	1	50	75	....	75	75	....	$ 2,650	$ 4,000	8	24	20	6	46	....
2	Hotels	3	24	40	....	7	18	....	16,906	4,120	52	....	....	52	....	....
	Total	4	74	115	....	82	93	....	$ 19,556	$ 8,120						
	Average	....	....	....	....	....	....	....	....	....	30	12	10	29	23	....

FLOYD COUNTY.

1	Agricultural implement manufactory	1	9	....	....	5	....	....	$ 2,011	$ 888	12	30	10	3	23	26
2	Furniture manufactory	1	45	....	....	30	....	1	15,000	16,000	45	....	7	48	....	4
3	Hotel	1	6	9	....	5	7	....	3,600	2,500	....	52	....	....	52	....
4	Sash and door manufactory	1	16	....	3	17	....	3	4,900	5,427	52	....	....	39	6	7
	Total	4	76	9	3	57	7	4	$ 25,511	$ 24,815						
	Averages	....	....	....	....	....	....	....	....	....	27	21	4	23	20	9

FRANKLIN COUNTY.

1	Brick manufactory	1	5	....	....	5	....	....	$ 973	$ 600	26	....	26	12	....	40
2	Milling grain	1	5	....	....	5	....	....	2,740	2,500	....	35	17	40	12	....
	Total	2	10	....	....	10	....	....	$ 3,713	$ 3,100						
	Averages	....	....	....	....	....	....	....	....	....	13	17	22	26	6	20

FREMONT COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895.			NO. EMPLOYED, 1896.			Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895.			NO. WEEKS IN OPERATION, 1896.		
			Males.	Females.	Apprentices.	Males.	Females.	Apprentices.			Full time, full force.	Short time, reduced force.	Suspended.	Full time, full force.	Short time, reduced force.	Suspended.
1	Brick manufactories	2	16	.....	.....	5	.....	.....	$ 1,755	$ 600	17	29	6	5	......	47
	Total	2	16	.....	.....	5	.....	.....	$ 1,755	$ 600						
	Average	.....	.....	.....	.....	.....	.....	.....	....	....	17	29	6	5	.....	47

GREENE COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	Males, 1895.	Females, 1895.	Apprentices, 1895.	Males, 1896.	Females, 1896.	Apprentices, 1896.	Wages, 1895.	Wages, 1896.	Full time, full force, 1895.	Short time, reduced force, 1895.	Suspended, 1895.	Full time, full force, 1896.	Short time, reduced force, 1896.	Suspended, 1896.
1	Brick manufactory	1	20	.....	.....	22	.....	.....	$ 7,509	$ 7,902	18	24	10	20	32	......
2	Coal mining	1	15	.....	.....	13	.....	.....	2,105	1,587	15	......	37	13	.....	39
3	Sash and door manufactory	1	35	1	.....	23	1	.....	15,249	14,570	36	16	......	40	12	......
	Total	3	70	1	.....	58	1	.....	$ 24,863	$ 24,059						
	Average	.....	.....	.....	.....	.....	.....	.....	....	....	23	13	16	24	15	13

GRUNDY COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	Males, 1895.	Females, 1895.	Apprentices, 1895.	Males, 1896.	Females, 1896.	Apprentices, 1896.	Wages, 1895.	Wages, 1896.	Full time, full force, 1895.	Short time, reduced force, 1895.	Suspended, 1895.	Full time, full force, 1896.	Short time, reduced force, 1896.	Suspended, 1896.
1	Hotel	1	2	5	.....	2	5	.....	$ 1,184	$ 1,194	52	......	.....	52	......	......
	Total	1	2	5	.....	2	5	.....	$ 1,184	$ 1,194						
	Average	.....	.....	.....	.....	.....	.....	.....	....	....	52	......	......	52	....	.....

GUTHRIE COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	Males, 1895.	Females, 1895.	Apprentices, 1895.	Males, 1896.	Females, 1896.	Apprentices, 1896.	Wages, 1895.	Wages, 1896.	Full time, full force, 1895.	Short time, reduced force, 1895.	Suspended, 1895.	Full time, full force, 1896.	Short time, reduced force, 1896.	Suspended, 1896.
1	Brick manufactories	3	25	.....	.....	28	.....	.....	$ 3,789	$ 3,167	10	9	33	12	12	28
2	Coal mining	5	34	.....	.....	30	.....	.....	5,118	4,800	21	4	27	16	......	36
3	Hotel	1	4	6	.....	3	5	.....	1,772	1,500	47	5	.....	52	.....	......
4	Woolen mill	1	10	5	.....	7	5	.....	2,506	1,941	31	2	19	25	......	27
	Total	10	73	11	.....	68	10	.....	$ 13,185	$ 11,408						
	Average	.....	.....	.....	.....	.....	.....	.....	....	....	27	5	20	26	3	23

HAMILTON COUNTY.

1	Agricultural implement manufactory	1	18	..	1	17	....	1	$ 9,250	$ 9,650	50	....	2	25	27	....
2	Baker	1	3	2	....	3	2	....	1,960	1,960	52	....	....	52	....	....
3	Bottler	1	7	....	....	6	....	....	3,606	2,800	52	....	....	52	....	....
4	Brick and tile manufactory	1	25	....	....	25	....	....	6,400	6,400	32	....	20	32	....	20
5	Canning vegetables	1	70	40	....	....	....	....	2,120	....	6	....	46	....	....	52
6	Dry goods, retail	1	3	2	....	3	2	....	1,000	1,080	52	....	....	52	....	....
7	Heating apparatus manufactory	1	18	....	....	24	....	....	7,473	7,166	50	2	....	40	....	12
8	Hotel	1	5	9	....	5	9	....	3,280	2,844	52	....	....	52	....	....
9	Laundry	1	4	12	....	5	16	....	4,156	6,105	52	....	....	52	....	....
10	Merchant tailoring	1	12	....	1	10	....	....	4,800	4,000	44	8	....	44	8	....
11	Newspaper, printing and binding	1	7	....	....	8	....	....	2,400	2,800	52	....	....	52	....	....
12	Shoe manufactory	1	31	17	....	30	16	....	14,239	13,733	45	....	7	47	....	5
13	Telephone operator	1	3	2	....	3	2	....	1,280	11,880	....	52	....	52	....	....
14	Wholesale groceries	1	10	....	....	8	1	....	10,584	11,500	52	....	....	52	....	....
	Total	14	216	84	2	147	48	1	$ 72,448	$ 69,918						
	Average	....	....	....	....	....	....	....	....	....	42	5	5	43	3	6

HANCOCK COUNTY.

1	Hotel	1	3	3	....	2	3	....	$ 1,347	$ 1,120	52	....	....	52	....	....
	Total	1	3	3	....	2	3	....	$ 1,347	$ 1,120						
	Average	....	....	....	....	....	....	....	....	....	52	....	....	52	....	....

HARDIN COUNTY.

1	Brick and tile manufactories	3	34	....	....	22	....	....	$ 5,778	$ 3,876	21	9	22	14	....	38
2	Electric light and steam heating	1	5	....	....	5	....	....	2,020	2,470	52	....	....	52	....	....
3	Hotels	2	5	10	....	5	10	....	3,200	2,975	52	....	....	52	....	....
4	Laundry	1	2	3	....	3	3	....	350	1,248	17	....	35	51	....	1
5	Merchant tailoring	1	9	1	....	8	1	....	3,000	3,000	40	8	4	37	15	....
6	Planing mill	1	6	....	....	6	....	....	2,304	2,002	30	14	8	24	23	5
7	Spring manufactory	1	5	....	....	10	....	....	2,610	3,547	52	....	....	52	....	....
8	Stone quarry	1	10	....	....	10	....	....	4,000	4,000	32	20	....	32	20	....
	Total	11	76	14	....	69	14	....	$ 23,262	$ 23,118						
	Average	....	....	....	....	....	....	....	....	....	37	6	9	39	8	5

HARRISON COUNTY.

1	Brick manufactory	1	11	....	....	11	....	....	$ 2,189	$ 1,669	22	....	30	19	2	31
2	Newspaper, printing and binding	1	9	....	....	8	1	....	970	1,044	52	....	....	52	....	....
	Total	2	20	....	....	19	1	....	$ 3,159	$ 2,713						
	Average	....	....	....	....	....	....	....	....	....	37	....	15	35	1	16

HENRY COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Brick manufactory	1	10	....	.....	7	.....	.....	$ 800	$ 975	26	12	14	6	20	26
2	Dry goods and millinery, retail	2	4	7	2	3	7	2	2,875	2,850	52	.....	.....	52	.....	.....
3	Gas and electric light manufactory	1	8	.....	.....	9	.....	....	4,824	5,004	52	.....	.....	52	.....	.....
4	Hotel	1	2	8	.....	2	8	.....	1,600	1,560	52	.....	.....	52	.....	.....
5	Milling, grain and feed	1	22	1	.....	16	1	.....	7.032	6,148	.....	52	.....	.....	52	.....
6	Newspapers, printing and binding	3	16	4	....	13	4	.....	4.380	4,195	52	....	.....	52	.....	.....
7	Planing mill	1	13	.....	.....	12	....	...	4,500	5,000	42	.....	10	44	8	.....
8	Road grader	1	30	.....	.....	..	.....	.....	4,800	.....	35	.....	17	.....	.....	53
	Total	11	105	20	2	62	20	2	$ 30,811	$ 25,732						
	Average	.....	.....	.....	.....	.....	.....	....	.....	.....	39	8	5	33	10	9

HOWARD COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Hotel	1	3	8	.....	3	8	....	$ 3,960	$ 3,960	52	.....	.....	52	.....	.....
2	Windmills and woodworker	1	11	.....	.....	8	....	1	3,575	1,200	52	.....	.....	28	20	4
	Total	2	14	8	.....	11	8	1	$ 7,535	$ 5,160						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.	52		.....	40	10	2

HUMBOLDT COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Bottler	1	4	1	.....	4	1	.....	$ 1,875	$ 1,875	52	.....	.....	52	....	.....
2	Cigar manufactory	1	12	7	4	12	7	4	5,000	5,000	51	.....	1	51	.....	1
	Total	2	16	8	4	16	8	4	$ 6,875	$ 6.875						
	Average	.....	. .	.....	....	. .	... .	...	.....	.....	51	.....	1	51	....	1

IDA COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Hotel	1	1	5	.....	1	5	....	$ 976	$ 1,050	52	.....	.....	52	.....	.....
	Total	1	1	5	.....	1	5	.....	$ 976	$ 1,050						
	Average	...	.....	.....	.....	...	.....	.....	.....	.....	52	.....	....	52		.....

IOWA COUNTY.

1	Brick and tile manufactories	3	39	1	....	32	....	....	$ 8,600	$ 5,800	18	9	26	11	4	37
2	Dry goods, retail	1	4	1	....	3	2	....	2,340	2,300	52	....	....	52	....	....
3	Hotels	2	6	8	....	6	7	2	2,320	2,650	52	....	....	52	....	....
	Total	6	49	10	....	41	9	2	$ 13,260	$ 10,750						
	Average	....	....	....	....	....	....	....	....	....	41	3	8	38	1	13

JACKSON COUNTY.

1	Barrel manufactory	1	12	....	....	12	....	....	$ 2,250	$ 2,600	25	....	27	28	....	24
2	Brick and tile manufactory	1	7	....	....	7	....	....	900	900	20	....	32	20	....	32
3	Butter tub manufactory	1	7	1	....	8	....	....	3,000	2,400	32	16	4	30	15	7
4	Cigar manufactories	2	17	4	....	10	4	....	9,267	8,3[illegible]5	52	....	....	50	....	2
5	Hotel	1	2	3	....	2	3	....	470	470	52	....	....	52	....	....
6	Lime manufactories	2	87	....	....	80	....	....	36.720	30,100	52	....	....	28	14	10
7	Saw mills	2	33	....	....	100	....	....	14,026	40,000	26	26	....	52	....	....
8	Woolen mill	1	10	4	....	10	4	....	2,415	2,415	26	....	26	26	....	26
	Total	11	175	12	....	229	11	....	$ 69,048	$ 87,210						
	Average	....	....	....	....	....	....	....	....	....	36	5	11	36	4	12

JASPER COUNTY.

1	Agricultural implement manufactories	2	35	1	2	65	1	....	$ 10,600	$ 15,212	25	25	2	23	16	13
2	Brick manufactory	1	8	....	....	10	....	....	2,150	1,500	22	....	30	16	....	36
3	Clothing manufactory	1	4	26	....	7	30	....	6,480	6,502	40	12	....	36	12	4
4	Coal mining	2	271	....	....	220	....	....	146,560	121,080	26	12	14	18	12	22
5	Dry goods, retail	1	3	3	....	3	3	....	2.300	2,300	52	....	....	52	....	....
6	Foundry and machine shop	1	8	....	....	8	....	....	3,575	4.200	40	12	....	40	12	....
7	Hotels	3	13	21	....	15	18	....	6,937	6,548	52	....	....	52	....	....
	Total	11	342	51	2	328	52	....	$ 178,602	$ 157,142						
	Average	....	....	....	....	....	....	....	....	....	37	9	6	34	8	10

JEFFERSON COUNTY.

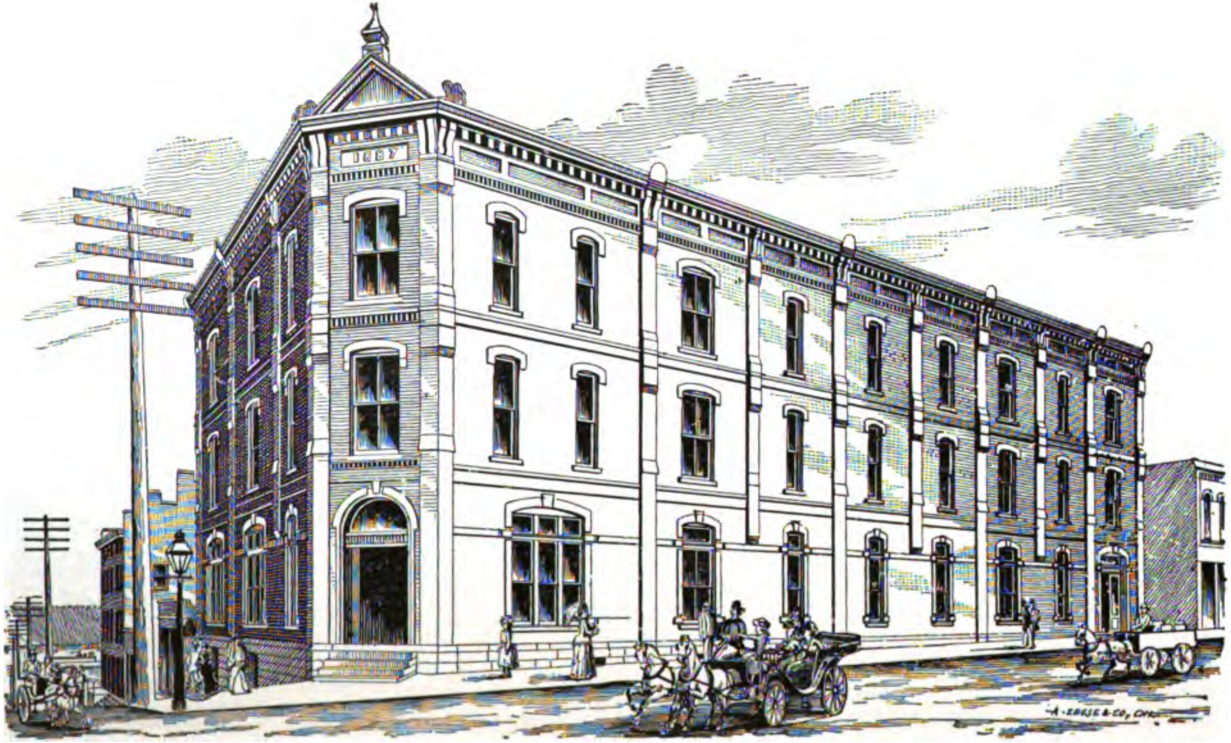
1	Brick manufactory	1	19	1	....	18	....	....	$ 4,330	$ 1,785	23	6	23	14	....	
2	Cigar manufactory	1	5	....	1	5	....	1	2,400	1,560	52	....	....	52	....	....
3	Dry goods, retail	2	8	4	....	8	4	....	4,330	4,565	52	....	....	52	....	....
4	Farm tool manufactory	1	20	2	....	17	1	....	6,536	5,997	52	....	....	52	....	....
5	Hotel	1	3	8	....	5	9	....	1,540	1,992	52	....	....	52	....	....
6	Laundry	1	3	3	....	3	3	....	1,680	1,470	52	....	....	20	32	....
7	Merchant tailors	2	11	9	....	8	8	2	7,000	6,850	52	....	....	52	....	....
8	Newspaper, printing and binding	1	7	1	....	7	1	....	3,500	3,328	52	....	....	52	....	....
	Total	10	76	28	1	71	26	3	$ 31,316	$ 27,547						
	Average	....	....	....	....	....	....	....	....	....	48	1	3	43	4	5

JOHNSON COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Brick manufactories	2	15	.....	.....	17	.....	.....	$ 2,700	$ 2,900	28	.....	24	20	.....	32
2	Cigar manufactory	1	5	.....	.....	5	.....	.....	2,340	2,500	52	.....	..	52	.....	.....
3	Clothing, retail	1	7	.....	.....	7	.....	.....	3,840	3,840	52	.....	.....	52	.....	.....
4	Contractor and builder	1	25	.....	.....	20	.....	.....	9,500	7,500	24	8	20	24	8	20
5	Cornice and tinware manufactory	1	10	.....	2	10	.....	2	2,205	2,205	30	22	.....	30	22	.....
6	Dry goods and millinery, retail	1	6	8	2	7	8	3	5,560	5,736	52	.....	.....	52	.....	.....
7	Glove and mitten manufactory	1	3	25	.....	10	60	.....	5,337	10,000	26	20	6	15	29	8
8	Hotels	2	10	15	.....	15	16	.....	4,000	4,860	52	.....	.....	52	.....	.....
9	Laundries	2	4	3	.....	7	9	.....	2,532	4,985	52	.....	.....	52	.....	.....
10	Linseed oil manufactory	1	20	.....	.....	14	.....	.....	3,594	6,115	14	.....	38	8	44	.....
11	Newspapers, printing and binding	3	36	5	.....	33	6	5	15,265	14,968	52	.....	.....	52	.....	.....
12	Painters and paper hanging	2	20	.....	.....	22	.....	.....	4,340	4,840	30	2	20	30	2	20
13	Perfumes and toilet article manufactory	1	14	10	.....	20	15	.....	17,197	10,500	52	.....	.....	52	.....	.....
14	Sorghum manufactories	2	24	.....	.....	24	.....	.....	740	740	4	.....	48	4	.....	48
15	Wholesale grocery	1	10	1	.....	10	1	.....	7,060	7,920	52	.....	.....	52	.....	.....
16	Wood and ice, retail	1	6	.....	.....	6	.....	.....	1,400	2,000	39	13	.....	39	13	.....
	Total	23	215	67	4	227	115	10	$ 87,610	$ 91,609						
	Average	.....	...	.....	.....	...	.....	.....	.....	.....	38	4	10	37	7	8

JONES COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Agricultural implement manufactory	1	5	.....	1	9	.....	1	$ 1,708	$ 1,950	18	34	.....	16	36	.....
2	Brick and tile manufactory	1	10	.....	.....	.....	.....	.....	1,221	.....	20	.....	32	.....	.....	.....
3	Canning, vegetables	1	30	24	.....	.....	.....	.....	1,943	.....	.....	15	37	.....	.....	.....
4	Feather duster manufactory	1	19	34	.....	15	32	.....	9,235	8,173	32	12	8	24	19	9
5	Saw mill	1	.....	.....	.....	87	.....	.....	.....	34,500	.....	.....	.....	52	.....	.....
6	Stone quarry	1	399	.....	.....	458	.....	.....	78,000	100,000	32	...	20	37	.....	15
	Total	6	463	58	1	569	32	1	$ 92,107	$ 144,623						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	21	12	19	33	14	6



IRWIN-PHILLIPS CO., MANUFACTURERS OVERALLS, SHIRTS, ETC., KEOKUK.

KEOKUK COUNTY.

1	Brick manufactories	4	32	....	....	25	....	....	$ 6,264	$ 4,274	25	2	25	20	7	25
2	Coal mining	8	361	....	....	327	....	....	153,725	125,889	20	25	7	19	27	6
3	Hotel	1	1	6	....	2	5	....	728	1,000	52	....	....	52	....	....
4	Miners' tools manufactory	1	15	....	....	12	.	....	9,360	7,800	52	....	....	52	....	....
	Total	14	409	6	....	366	5	....	$ 170,077	$ 138,963						
	Average	....	....	....	....	....	....	....	....	....	38	6	8	36	8	8

KOSSUTH COUNTY.

1	Brick manufactory	1	10	....	....	6	....	....	$ 1.400	$ 375	15	....	37	8	....	44
2	Laundry	1	2	3	....	2	3	....	1,000	1,250	52	....	....	52	....	....
	Total	2	12	3	....	8	3	....	$ 2,400	$ 1,625						
	Average	....	....	....	....		....	....	....	....	34	....	18	30	....	22

LEE COUNTY.

1	Agricultural implement manufactory	2	*240	....	....	*255	....	....	$ 63,000	$ 54,449	47	3	2	43	4	5
2	Agricultural implements, retail	1	7	....	....	6	....	....	4,819	5,120	52	....	....	52	....	....
3	Bag manufactory	1	9	15	....	9	18	....	8,385	10,002	52	....	....	52	....	....
4	Baker	1	10	2	....	9	2	....	5,356	4,940	52	....	....	52	....	....
5	Beer manufactory	2	17		....	15	....	....	7,780	7,111	52	....	....	52	....	....
6	Box (paper) manufactory	1	2	10	....	2	8		2,600	2,360	46	6	....	40	12	....
7	Boot and shoe manufactory	1	135	115	25	135	125	35	120,000	123,000	52	....	....	48	2	2
8	Boots and shoes, retail	1	2	4	....	3	3	....	1,580	1,841	52	....	....	52	....	....
9	Brick manufactory	1	13	....	....	14	....	....	2,500	3,838	26	....	26	25	....	27
10	Can (tin) manufactory	1	85	37	....	99	53	....	20,740	11,263	30	....	22	20	32	....
11	Canning vegetables and pickles	2	125	135	....	125	110	....	15,501	10,807	4	8	40	2	10	40
12	Carriage manufactory	1	6	....	....	5	....	....	2,200	2,000	39	13	....	44	8	....
13	Cigar manufactories	3	18	1	....	5	....	....	7,822	2,043	40	10	2	34	9	9
14	Clothing manufactory	1	40	110	....	40	114	....	58,396	57,764	48	....	4	36	8	8
15	Clothing, retail	1	6	....	....	6	....	....	4,238	4,225	52	....	....	52	....	....
16	Contractors and builders	2	21	....	....	20	....	....	8,276	6,842	20	12	20	20	28	4
17	Cooperage	3	89	1	....	80	....	....	30,993	27.082	26	20	6	17	26	9
18	Crockery, retail	1	....	....	....	5	2	....	....	4,500	....	....	....	52	....	....
19	Dry goods, retail	7	23	24	....	29	28	....	15,352	19,599	52	....	....	52	....	....
20	Fire insurance	1	9	1	....	7	1	....	13,145	8,500	52	....	....	52	....	....
21	Foundries and machine shops	3	83	....	2	86	5	....	41,936	36,932	30	17	5	44	6	2
22	Furniture manufactories	3	†178	1	....	34	....	....	38,573	17,491	51	1	....	43	8	1
23	Furniture, retail	3	24	5	....	24	5	....	10,052	10,052	52	....	....	52	....	....
24	Gas manufactories	2	9	1	....	9	1	....	5,180	5,107	52	....	....	52	....	....
25	General merchandise	1	5	3	....	5	5	....	2,000	2,400	52	....	....	52	....	....
26	Harness and horse collar manufactories	2	23	7	....	21	7	....	5,629	6.386	30	15	7	31	13	8

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* Of which 148 for 1895 and 135 for 1896 are convicts. † Of which 139 are convicts and 39 free.

LEE COUNTY—CONTINUED.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
27	Hotels	5	39	12	....	43	20	....	$ 15,355	$ 17,469	52	....	....	45	....	7
28	Laundries	2	6	9	....	8	11	....	4,056	4,888	52	...	....	....	52	....
29	Livery and transfer	1	15	....	....	15	....	....	6,800	6,800	52	....	....	52	....	....
30	Merchant tailoring	3	27	4	....	24	4	....	16,898	14,077	37	15	....	29	19	4
31	Milling, grain and feed	1	8	1	....	13	1	....	4,587	6,969	50	2	....	52	....	....
32	Newspapers, printing and binding	7	71	11	10	88	11	7	40,214	46,154	52	....	....	52	....	....
33	Painter and paper hanger	1	10	1	2	17	1	....	2,975	3,501	52	....	....	42	10	....
34	Patent medicine manufactory	1	176	4	....	176	4	....	80,000	80,000	52	....	....	52	....	....
35	Plumbers, gas fitters and brass workers	2	16	....	....	12	....	....	6,830	5,800	37	15	....	32	20	....
36	Pork packer	1	150	....	....	127	....	....	43,032	39,589	34	18	....	30	22	....
37	Powder, blasting	1	70	....	....	90	....	....	88,229	44,919	17	33	2	30	21	1
38	Sawmills, sash, door and lumber manufactories	6	854	11	2	773	10	5	244,351	201,884	31	19	2	32	19	1
39	Starch manufactories	2	35	15	....	39	11	....	19,000	20,000	40	6	6	40	11	1
40	Street railways and electric power and lights	2	74	1	....	80	1	....	25,000	28,514	34	18	....	48	9	....
41	Telephone operator	1	2	3	....	2	4	....	1,620	1,790	52	....	....	52	....	....
42	Tinware and sheet iron manufactory	1	11	....	1	12	....	1	6,772	6,950	42	10	....	42	10	....
43	Vinegar and pickle manufactory	1	37	18	....	13	27	....	11,885	9,207	....	52	....	....	52	....
44	Wall paper and mouldings, retail	1	10	2	....	9	1	....	2,880	2,970	....	52	....	....	52	....
45	Water works	1	10	....	....	10	....	....	6,000	5,000	52	....	....	52	....	....
46	Wholesale drugs	1	6	....	....	7	....	....	4,848	4,644	52	....	....	52	....	....
47	Wholesale fruits	1	5	....	....	6	....	....	2,220	2,690	52	....	....	52	....	....
48	Wholesale groceries	4	71	6	....	76	7	....	55,674	58,772	52	....	....	52	....	....
49	Wholesale hardware	1	18	....	....	16	....	....	10,614	10,582	52	....	....	52	....	....
50	Wholesale jewelry	1	13	....	....	13	2	....	10,600	10,600	52	....	....	52	....	....
51	Wholesale millinery	2	16	2	....	17	18	....	15,645	17,229	52	....	....	52	....	....
52	Wholesale oils	1	7	2	....	8	2	....	6,420	6,660	52	....	....	52	....	....
53	Wholesale poultry and eggs	2	53	1	....	58	1	....	20,008	20,397	48	4	....	48	4	....
54	Wire fence manufactory	1	8	1	....	9	....	....	1,975	1,764	9	43	....	9	43	....
55	Wood, ice and coal, retail	3	145	1	....	186	1	....	17,020	17,200	12	40	....	12	40	....
56	Woolen mills	1	7	6	....	....	....	....	1,000	....	16	....	36	....	....	....
	Total	106	2,149	582	43	2,924	624	48	$ 1,218,561	$ 1,142,121						
	Average										41	8	3	39	10	3

LINN COUNTY.

1	Agricultural implements, retail	1	7	1	....	10	1	....	$ 3,446	$ 5,241	52	....	....	52	....	....
2	Baker	1	8	1	....	9	2	....	3,224	3,580	52	....	....	52	....	....
3	Bottlers	2	28	4	3	20	3	1	18,178	18,153	52	....	....	52	....	....
4	Brick and tile manufactories	7	74	....	....	63	....	....	14,459	7,159	20	1	31	15	2	35
5	Brush and broom manufactory	1	5	2	....	5	1	....	1,200	1,200	30	14	8	30	14	8
6	Carriage and wagon manufactories	2	60	....	2	47	....	....	18,901	14,004	23	29	....	34	16	2
7	Cigar manufactory	1	3	3	....	3	3	....	5,000	3,360	52	....	....	52	....	....
8	Clothing manufactory	1	30	30	....	30	30	....	14,000	14,000	52	....	....	52	....	....
9	Clothing, retail	3	31	2	3	31	2	3	20,648	19,507	52	....	....	52	....	....
10	Coal and wood, retail	2	12	....	....	13	....	....	7,622	7,182	52	....	....	52	....	....
11	Contractors and builders	3	159	....	....	232	....	....	7,070	9,348	41	41	....	12	....	40
12	Crockery, retail	1	10	2	....	10	3	....	9,165	9,595	52	....	....	52	....	....
13	Cracker and candy manufactories	3	58	51	....	52	43	....	44,490	37,574	44	8	....	33	19	....
14	Drugs and stock food manufactories	2	12	4	....	12	6	....	5,810	6,050	52	....	....	52	....	....
15	Dry goods, retail	4	49	45	....	49	47	....	41,450	42,620	52	....	....	52	....	....
16	Fire insurance	1	26	....	....	26	....	....	24,636	25,588	52	....	....	52	....	....
17	Foundries and machine shops	3	40	....	8	50	....	8	16,733	19,337	27	15	9	35	12	5
18	Furniture manufactories	2	9	1	1	12	3	....	3,748	4,350	20	30	2	28	17	7
19	Furniture, retail	1	7	....	....	7	....	....	4,160	3,810	52	....	....	52	....	....
20	Gas manufactory	1	8	....	....	10	....	....	5,600	6,000	52	....	....	52	....	....
21	General merchandise	1	35	40	....	35	40	....	12,000	12,000	52	....	....	52	....	....
22	Hotels	5	54	68	....	50	68	....	21,839	22,840	52	....	....	52	....	....
23	Hardware, retail	1	5	....	....	5	....	....	2,600	2,600	52	....	....	52	....	....
24	Laundries	3	9	26	....	9	27	....	10,164	10,827	36	16	....	36	16	....
25	Linseed oil manufactory	1	15	....	....	15	....	....	5,291	4,983	39	13	....	41	11	....
26	Milling and oat meal manufactories	3	91	30	....	211	97	....	63,690	93,999	36	12	4	45	4	3
27	Newspapers, printing and binding	6	93	13	4	115	20	9	56,360	64,501	52	....	....	42	7	3
28	Plumbing and steamfitters	1	7	1	....	7	1	....	4,000	4,000	39	13	....	39	13	....
29	Pump (iron and wood) manufactories	3	92	5	....	40	5	....	47,007	42,904	51	1	....	36	10	6
30	Pork packers	1	390	21	90	552	13	82	210,888	224,107	52	....	....	52	....	....
31	Sash, door and blind manufactories	3	115	1	....	131	1	....	32,026	44,116	25	17	10	30	22	....
32	Stone quarries	2	115	....	....	148	....	....	31,144	53,384	32	6	14	32	6	14
33	Street railways and electric power	2	93	....	....	87	....	....	50,757	48,535	52	....	....	52	....	....
34	Telephone operator	1	3	7	....	3	7	....	3 500	3,500	52	....	....	52	....	....
35	Vinegar and pickle manufactory	1	13	4	....	10	5	....	7,597	6 411	52	....	....	52	....	....
36	Wall paper and paints, retail	4	31	3	....	32	3	....	15,463	16,305	52	....	....	52	....	....
37	Water works	1	9	....	....	10	....	....	6,970	7,745	52	....	....	52	....	....
38	Wholesale coffee and spices	1	7	....	....	8	....	....	7,296	9,376	52	....	....	52	....	....
39	Wholesale groceries	3	36	1	....	36	2	....	27,600	28 640	52	....	....	52	....	....
40	Wholesale ice	2	32	....	....	33	....	....	9,002	9,494	26	26	....	26	26	....
41	Wholesale whiskey	1	12	....	....	10	....	....	7,860	7,260	52	....	....	52	....	....
42	Wool and scrap iron	1	7	....	....	7	....	....	3,229	3,358	52	....	....	52	....	....
	Total	89	1,899	366	111	2,238	433	103	$ 900,173	$ 973,585						
	Average	....	....	....	....	....	....	....	....	....	44	6	2	45	5	2

LUCAS COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Agricultural implement manufactory	1	8	....	....	.....	....	.. .	$ 3,389	....	52	.....	.....	..	.....	......
2	Broom manufactory	1	6	1	.	5	1	....	2,100	$ 2,200	48	.....	4	50	.....	2
3	Carriage and wagon manufactory	1	14	.....	3	13	.....	2	6,500	5,900	52	....	.....	52	....	......
4	Coal mining	1	18	.....	.....	19	.....	.....	4,995	5,180	20	32	.....	26	24	2
5	Hotels	2	10	14	.....	10	12	.....	4,435	4,046	52	.....		52	.....	......
6	Milling, lumber and grain	2	16	.....	.....	15	.....	.....	5,310	5,175	52	.....	....	52	......	......
7	Newspaper, printing and binding	1	5	1	2	5	1	1	2,500	2,500	52	...	....	52	......	.....
	Total	9	77	15	5	67	14	3	$ 29,229	$ 25 001						
	Average	.....	..	.....	.....	......	...	....	....	....	48	4	.....	47	4	1

LYON COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Hotel	1	1	6	.....	1	5	.....	$ 1,416	$ 1,310	52	......	......	52	......	......
	Total	1	1	6	.....	1	5	.....	$ 1,416	$ 1,310						
	Average	.....	.....	..	.....		.....	.....	....	....	52	.....	......	52	......	......

MADISON COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	General merchandise	2	.....	.....	.....	9	3	.....	....	$ 5,692	....	.....	....	52	......	.....
2	Hotel	1	4	3	.....	3	5	.....	$ 1,066	1,388	52	...	....	52	......	......
	Total	3	4	3		12	8		$ 1,066	$ 7,080						
	Average	.....	.....	.....	.....	....	.....	.....	....	....	52	...	......	52	......	.....

MAHASKA COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Baker	1	4	1	.....	4	1	....	$ 1,200	$ 1,200	52	......	.....	... ..	52	......
2	Brick manufactory	1	50	.....	.....	40	.. .	..	11,400	3,000	20	32	......	.....	4	48
3	Cigar manufactories	2	5	....	....	12	......	....	2,340	5,390	52	.....	.....	51	.....	1
4	Clothing, retail	2	10	2	.....	10	2	.....	7,280	6,580	52	. ...	.....	52	......	......
5	Coal mining	16	2,628	.....	.....	2,067	2	.....	1,001,175	944,549	23	24	5	26	23	3

MORRISON, McINTOSH & CO., MANUFACTURERS GLOVES AND MITTENS, GRINNELL.

6	Dry goods, retail	8	20	38	5	22	37	5	29,101	27,408	52	.....	.....	52	.....	.....
7	Eggs, shipping	1	10	.....	.....	10	.....	.....	2,647	2,105	30	.....	22	30	.....	22
8	Electric lights	1	.....	.....	.....	7	1	.....	.....	6,000	.....	.....	.....	52	.....	.....
9	Harness and saddle manufactory	1	5	.....	1	.....	.....	.....	2,588	.....	52	.....	.....	.....	.....	.....
10	Hotels	1	.....	.....	.....	8	4	.....	.....	1,000	.....	.....	.....	52	.....	.....
11	Iron bridge manufactory	1	25	.....	3	15	.....	.....	12,000	5,500	52	.....	.....	39	18	.....
12	Laundry	1	.....	.....	.....	3	5	.....	.....	1,912	.....	.....	.....	52	.....	.....
13	Livery and transfer line	1	22	.....	.....	25	.....	.....	9,700	11,200	52	.....	.....	52	.....	.....
14	Newspaper, printing and binding	1	12	3	.....	12	3	.....	6,500	6,500	52	.....	.....	52	.....	.....
15	Telephone operators	2	3	2	.....	5	6	.....	1,680	3,900	52	.....	.....	52	.....	.....
16	Wholesale confections	1	11	.....	.....	10	.....	.....	1,560	2,500	34	18	.....	52	.....	.....
17	Wholesale groceries	1	19	3	.....	17	3	.....	22,913	21,742	52	.....	.....	52	.....	.....
18	Wholesale harness and hardware	2	23	.....	.....	21	1	.....	14,100	11,500	52	.....	.....	52	.....	.....
	Total	39	2,842	49	9	2,253	65	5	$ 1,136,214	$ 1,061,986						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	45	5	2	42	6	4

MARION COUNTY.

1	Brick manufactory	1	10	.....	.....	.....	.....	.....	$ 1,500	.....	.....	20	32	.....	.....	.....
2	Canning vegetables	1	13	32	.....	38	49	.....	1,650	$ 3,178	8	.....	44	8	6	38
3	Coal mining	10	497	1	.....	269	.....	.....	142,254	97,653	11	30	11	11	29	12
4	Ditcher manufactory	1	15	.....	.....	6	.....	.....	3,500	2,830	40	.....	12	40	12	.....
5	Stone quarry	1	9	.....	.....	8	.....	.....	1,000	1,000	8	22	22	14	22	16
6	Wagon (farm) manufactory	1	15	.....	.....	15	.....	.....	5,200	5,200	30	15	7	30	15	7
	Total	15	559	33	.....	336	49	.....	$ 155,104	$ 109,856						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	16	15	21	21	17	14

MARSHALL COUNTY.

1	Bottler	1	8	.....	.....	10	.....	.....	$ 4,320	$ 4,500	16	36	.....	36	16	.....
2	Brick and tile manufactories	3	49	.....	.....	46	.....	.....	9,727	8,665	20	8	24	15	9	28
3	Canning vegetables	1	70	95	.....	140	60	.....	6,000	3,000	5	.....	47	6	1	45
4	Carriage manufactory	1	112	8	.....	74	8	.....	40,000	18,000	26	26	.....	26	26	.....
5	Drugs, retail	1	10	.....	.....	11	.....	.....	4,000	3,970	52	.....	.....	40	12	.....
6	Dry goods, retail	3	8	8	.....	10	14	.....	7,888	11,177	52	.....	.....	52	.....	.....
7	Foundries and machine shops	3	66	1	8	61	2	7	36,569	30,640	52	.....	.....	37	15	.....
8	Furniture, retail	1	7	1	.....	6	1	.....	3,652	3,302	52	.....	.....	52	.....	.....
9	Glucose manufactory	1	350	.....	.....	350	.....	.....	6,216	127,702	.....	6	46	52	.....	.....
10	Hardware, retail	1	7	1	.....	7	1	.....	4,010	4,010	52	.....	.....	52	.....	.....
11	Hides and tallow	1	19	1	.....	19	1	.....	7,000	7,000	52	.....	.....	52	.....	.....
12	Hotels and restaurants	4	18	34	.....	29	45	.....	9,700	12,012	52	.....	.....	46	6	.....
13	Ice and wood, retail	1	12	.....	.....	12	.....	.....	6,000	6,000	52	.....	.....	52	.....	.....
14	Laundries	2	4	14	.....	4	14	.	5,520	5,520	52	.....	.....	52	.....	.....
15	Linseed oil manufactory	1	19	.....	.....	18	.....	.....	5,851	6,944	20	32	.....	20	32	.....
16	Livery and transfer line	1	6	1	.....	6	1	.....	3,600	3,600	52	.....	.....	52	.....	.....
17	Lumber, retail	1	5	1	.....	5	1	.....	3,240	3,240	52	.....	.....	52	.....	.....

MARSHALL COUNTY—CONTINUED.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
18	Milling and grain	1	5			6			$ 2,800	$ 8,000	48	4		48	4	
19	Newspapers, printing and binding	3	33	4	4	46	3	3	24,167	23,594	52			46		9
20	Office furniture manufactory	1	5			5			2,500	2,500	21	31		26	25	1
21	Pork packer	1	66			73	5		31,225	26.350	52			52		
22	Quarry, stone	1	125			125			26,597	26,207	19	17	16	19	17	16
23	Stone mason, contractor	1	7						4,800		42	10				
24	Street cars, electric and power	1	23			23			10.705	10,407	52			52		
25	Syrup manufactory	1	10			12			4,800	2.300	40		12	26		26
26	Telephone operator	1	2	3		3	6		1,800	3,468	52			52		
27	Vinegar and pickling works	1	11	2		10	5		2,500	7,200	20	32		52		
28	Wholesale agricultural implements	1	[illegible]	2		8	2		8,000	7.500	52			52		
29	Wholesale groceries	2	9	5		32	5		36,000	33,000	52			52		
	Total	42	1,094	181	12	1,151	174	10	$ 319,187	$ 404,808						
	Average										40	7	5	42	6	4

MILLS COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Neckyoke manufactory	1	12			10			$ 3,500	$ 1,800	30	22		30	22	
	Total	1	12			10			$ 3,500	$ 1,800						
	Average										30	22		30	22	

MITCHELL COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Hotel	1	3	8		3	7		$ 2,995	$ 2,860	52			52		
2	Woolen mill	1	3	2		3	2		800	800	30		22	20		32
	Total	2	6	10		6	9		$ 3,795	$ 3,660						
	Average										41		11	37		15

MONONA COUNTY.

1	Bottler	1	5	.....	.....	.....	.....	.....	$ 906	....	8	44	.....	.....	.....
2	Hotel	1	3	3	.....	3	3	.....	1,190	$ 1,190	52	.....	.....	52	.....
3	Sorghum manufactory	1	9	.....	.....	10	.....	.....	216	238	2	.....	50	3	.....	49
	Total	3	17	3	.....	13	3	.....	$ 2,312	$ 1,428						
	Average	.....	.....	.....	.....	.....	.....	.....	....	....	21	15	16	27	.....	25

MONROE COUNTY.

1	Canning vegetables	1	33	39	.....	20	25	.....	$ 2,989	$ 1,232	9	4	39	10	.....	42
2	Cigar manufactory	1	10	3	8	6	3	3	3,463	3,000	51	1	.....	26	26	.....
3	Coal mining	7	1,107	.....	.....	839	.....	.....	513,389	391,302	24	23	6	27	14	11
4	Hotel	1	4	8	.....	4	7	.....	2,000	680	52	.....	.....	20	.....	32
5	Newspaper, printing and binding	1	5	1	.....	.....	.....	.....	1,400	....	52	.....	.....	.....	.....	.....
6	Pump and implement manufactory	1	10	.....	.....	10	.....	.....	3,200	2,210	20	10	23	.....	52	.....
	Total	12	1,169	51	8	879	35	3	$ 526,441	$ 398,424						
	Average	.....	.....	.....	.....		.....	.....	....	....	35	6	11	17	18	17

MONTGOMERY COUNTY.

1	Brick and tile manufactories	4	45	.....	.....	55	.....	.....	$ 10,687	$ 11,440	28	4	20	27	3	22
2	Dry goods, retail	1	3	3	.....	3	3	.....	2,464	2,400	52	.....	.....	52	.....	.....
3	Hotels	2	8	13	.....	10	9	.....	4,440	4,570	50	.....	2	52	.....	.....
4	Milling grain	1	5	.....	.....	5	.....	.....	2,288	2,563	42	2	8	42	3	8
5	Newspaper, printing and binding	1	33	17	4	45	30	4	17,000	25,000	8	44	.....	8	44	.....
6	Water tank manufactory	1	14	.....	.....	15	.....	.....	2,100	2,895	25	25	2	20	33	.....
7	Wholesale groceries	1	11	1	.....	9	1	.....	7,607	12,111	52	.....	.....	52	.....	.....
	Total	11	119	34	4	142	43	4	$ 46,586	$ 60,979						
	Average	.....	.....	.....	.....	.....	.....	.....	....	....	37	11	4	36	11	5

MUSCATINE COUNTY.

1	Box manufactory	1	75	.....	.....	.....	.....	.....	$ 21,804	....	40	12	.....	.....	.....	.....
2	Brick and tile manufactories	7	55	.....	5	52	2	5	11,484	$ 8,524	20	13	20	23	10	20
3	Button manufactory	1	20	40	.....	40	100	.....	18,000	30,200	52	.....	.....	52	.....	.....
4	Cigar manufactories	2	8	14	.....	8	18	.....	6,328	5,971	41	11	.....	51	.....	1
5	Contractor and builder	1	5	.....	1	8	.....	2	1,133	1,658	26	.....	26	26	.....	26
6	Cooperage	1	10	.....	.....	11	.....	.....	4,600	3,077	52	.....	.....	13	23	17
7	Dry goods, retail	3	14	28	.....	16	28	.....	14,408	14,708	52	.....	.....	52	.....	.....
8	Foundry and machine shop	1	8	1	1	11	1	.....	2,500	3,000	.....	52	.....	...	52	.....
9	Hotel	1	9	9	.....	9	12	.....	2,718	3,382	52	.....	.....	52	.....	.....
10	Laundries	1	3	6	.....	8	6	.....	2,148	2,148	52	.....	.....	52	.....	.....
11	Marble, retail	1	4	1	.....	4	1	.....	2,000	1,000	52	.....	.....	.....	52	.....

MUSCATINE COUNTY—CONTINUED.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895.			NO. EMPLOYED, 1896.			Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895.			NO. WEEKS IN OPERATION, 1896.		
			Males.	Females.	Apprentices.	Males.	Females.	Apprentices.			Full time, full force.	Short time, reduced force.	Suspended.	Full time, full force.	Short time, reduced force.	Suspended.
12	Newspapers and printing	2	28	1	4	27	2	4	$ 19,242	$ 19,867	52	....	....	52	....	....
13	Oatmeal manufactory	1	60	65	....	65	65	....	43,000	50,000	50	2	....	40	8	4
14	Plumber's outfit manufactory	1	32	1	4	35	1	2	15,525	15,300	52	....	....	52	....	....
15	Sash, door, blind and lumber manufactories	5	993	4	....	1,097	2	....	296,198	323,725	22	28	2	27	19	6
16	Stoneware manufactory	1	5	....	....	7	....	....	1,500	1,500	26	26	....	26	26	....
17	Street railway, electric and gas power	1	39	1	....	49	1	....	18,000	14,400	52	....	....	52	....	....
18	Wholesale crockery	1	12	....	....	10	....	2	7.000	6,000	52	....	....	52	....	....
19	Wholesale fruit	2	21	7	....	28	10	....	10,000	8,800	52	....	....	26	26	....
20	Wholesale groceries	3	29	....	....	29	....	....	20,734	21,540	52	....	....	52	....	....
21	Wholesale hardware and saddlery	1	36	4	....	40	4	....	11,714	16,370	18	33	1	32	20	....
	Total	38	1,466	172	15	1,549	248	15	$ 520,036	$ 541,160						
	Average	....	....	....	....	....	....	....	....	....	41	9	2	36	12	4

O'BRIEN COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	Males.	Females.	Apprentices.	Males.	Females.	Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	Full time, full force.	Short time, reduced force.	Suspended.	Full time, full force.	Short time, reduced force.	Suspended.
1	Brick manufactory	1	19	....	....	18	....	....	$ 1,714	$ 1,000	15	....	37	8	....	44
2	Hotel	1	4	8	....	6	7	....	2,400	2,800	52	....	....	52	....	....
3	Milling, grain	1	7	....	....	7	....	....	2,500	3,120	35	17	....	52	....	....
4	Wholesale groceries	1	8	....	....	7	....	....	8,820	7,920	52	....	....	52	....	....
	Total	4	38	8	....	38	7	....	$ 15,434	$ 14,840						
	Average	....	....	....	....	....	....	....	....	....	39	4	9	41	....	11

OSCEOLA COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	Males.	Females.	Apprentices.	Males.	Females.	Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	Full time, full force.	Short time, reduced force.	Suspended.	Full time, full force.	Short time, reduced force.	Suspended.
1	Milling, grain	1	5	....	....	5	....	....	$ 3,924	$ 3,496	52	....	....	52	....	....
	Total	1	5	....	....	5	....	....	$ 3,924	$ 3,496						
	Average	....	....	....	....	....	....	....	....	....	52	....	....	52	....	....

PAGE COUNTY.

1	Brick and tile manufactories	2	29	....	....	10	....	....	$ 4,696	$ 1,414	10	11	31	6	18	21
2	Canning, vegetables	1	90	60	....	160	65	....	3,410	3,000	5	5	42	3	8	41
3	Cigar manufactory	1	5	....	1	5	.	1	1,750	1,750	52	....	....	52	....	....
4	Clothing manufactory	1	..	6	....	....	6	....	709	785	26	....	26	26	....	26
5	Coal mining	3	36	....	....	26	....	.	5,850	4.500	21	2	29	23	19	10
6	Hotel	1	4	7	....	4	6	....	1,466	1,440	52	....	....	52	....	....
	Total	9	164	73	·1	205	77	1	$ 17,881	$ 12,889						
	Average	....	...	....	....	....	....	....	....	....	28	3	21	27	8	7

PALO ALTO COUNTY.

1	Hotels	2	8	15	....	8	15	....	$ 4.060	$ 3,892	52	....	....	52	....	....
	Total	2	8	15	....	8	15	....	$ 4.060	$ 3,892						
	Average	....	....	....	....	....	....	....	....	....	52	....	....	52	....	....

PLYMOUTH COUNTY.

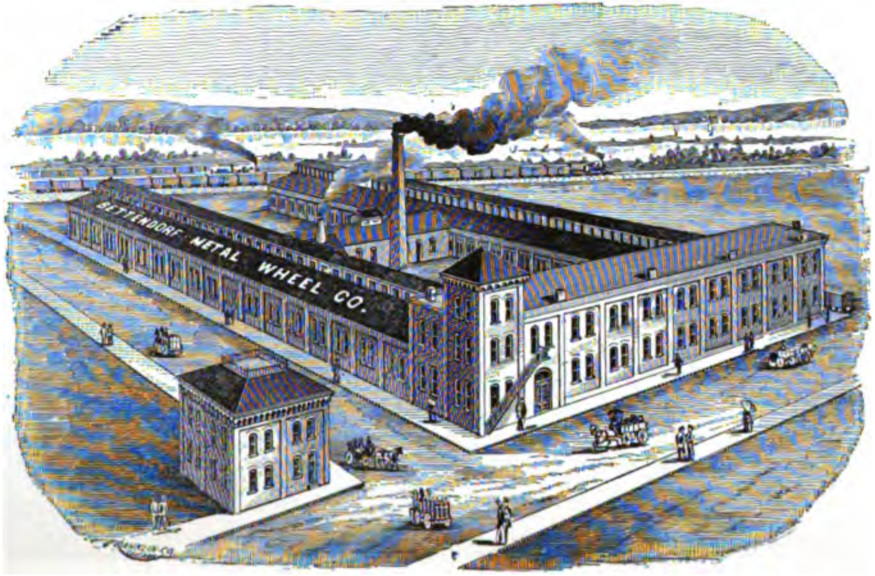
1	Brick and tile manufactory	1	15	....	....	10	....	....	$ 1.677	$ 1.200	12	40	....	6	46	....
2	Foundry and machine shop	1	17	....	....	15	....	....	9,600	4.368	40	....	12	17	35	....
3	General merchandise	1	6	3	..	6	4	....	4,530	3,495	52	....	....	52	....	....
4	Hotels	2	7	13	...	7	12	....	4 064	4,080	52	....	....	52	....	....
5	Laundry	1	3	4	....	3	4	....	2.440	2.440	52	....	....	52	....	....
6	Merchant tailor	1	5	4	....	7	4	....	4,750	5.200	40	12	....	40	12	....
7	Milling and grain	2	59	....	....	65	....	....	31.700	33,500	52	....	....	52	....	....
8	Newspapers and printing	2	15	5	4	5	8	2	6,313	4.354	38	14	....	52	....	....
9	Water works	1	....	....	....	9	....	....	....	2,599	....	....	....	32	....	20
	Total	12	127	29	4	127	32	2	$ 65,074	$ 61,236						
	Average	....	....	....	....	....	....	....	....	....	42	8	2	40	10	2

POLK COUNTY.

1	Agricultural implements and machinery, retail	5	93	7	5	77	6	8	$ 63,297	$ 58,858	48	4	....	44	8	....
2	Art glass and show cases	1	5	2	....	4	1	....	2,704	1,872	52	....	....	....	36	16
3	Bakeries	3	14	8	2	18	3	1	5,520	6.604	52	....	....	52	....	....
4	Bicycles, retail and repairing	2	12	....	....	10	....	....	4,370	1,000	44	4	4	16	36	....
5	Boxes (paper) manufactory	1	9	3	....	3	12	....	1,920	2.400	52	....	....	50	2	....
6	Brick and tile manufactories	9	267	....	....	317	....	....	108.188	76,862	24	8	20	22	9	21
7	Carriage and wagon manufactories	3	61	3	....	74	3	....	35.526	44,435	32	20	....	27	25	....
8	Chinaware and crockery, retail	1	1	4	....	1	4	....	1.280	1,280	52	....	....	52	....	....
9	Chinaware and crockery, wholesale	1	14	4	....	13	4	....	10,100	10,157	52	....	....	52	....	....
10	Cigar manufactories	7	73	8	11	60	6	10	34,954	33,940	45	4	3	42	5	5
11	Clothing, retail	6	62	3	....	61	4	1	42,568	41,334	52	....	....	52	....	....

POLK COUNTY—CONTINUED.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
12	Coal mining	14	810	....	....	1181	....	....	$ 291,834	$ 363,716	27	21	4	24	21	7
13	Coal and lime, retail	1	10	....	....	10	....	....	8,000	8,000	52	....	....	52	....	....
14	Contractors and builders	4	58	....	....	45	....	....	21,047	19,236	25	12	15	30	12	10
15	Cooperage	1	10	....	....	....	....	....	3,400	....	30	....	22	....	....	....
16	Cracker and candy manufactories	2	48	49	....	39	51	....	31,142	15,050	27	24	1	18	23	11
17	Dry goods, retail	5	96	74	1	112	80	1	75,239	84,839	52	....	....	52	....	....
18	Dry goods, wholesale	1	6	....	....	6	....	....	4,300	4,400	52	....	....	52	....	....
19	Electric supply manufactory	1	7	....	1	8	....	....	4,121	3,100	52	....	....	20	32	....
20	Engraver and electrotyper	1	8	....	2	9	....	....	4,535	5,235	52	....	....	52	....	....
21	Foundries and machine shops	7	116	1	17	81	....	15	49,381	37,666	30	19	3	31	20	1
22	Fur, retail and wholesale	2	9	22	....	5	13	....	8,700	7,000	39	13	....	40	12	....
23	Furniture manufactories	3	135	6	5	94	12	5	65,192	45,755	22	30	....	17	35	....
24	Furniture, retail	1	11	....	....	11	....	....	6,510	6,510	52	....	....	52	....	....
25	Gas and electric lights	3	77	2	....	56	2	....	53,623	45,330	52	....	....	52	....	....
26	General merchandise	2	12	10	....	13	8	....	9,904	6,404	52	....	....	52	....	....
27	Glove manufactory	1	14	16	....	20	22	....	6,000	8,400	40	12	....	40	12	....
28	Groceries, retail	4	21	2	....	51	2	....	11,432	17,640	52	....	....	46	....	6
29	Groceries, wholesale	4	69	5	....	67	5	....	71,300	74,633	52	....	....	52	....	....
30	Hardware, retail	2	19	....	1	39	....	2	10,562	12,356	50	2	....	42	10	....
31	Hardware, wholesale	2	37	1	....	36	2	....	33,280	35,524	52	....	....	52	....	....
32	Hotels and restaurants	12	173	118	....	168	92	....	83,631	84,544	52	....	....	52	....	....
33	Insurance, fire and life	12	129	32	....	137	32	....	141,477	154,190	52	....	....	52	....	....
34	Ice, retail	1	5	....	....	130	....	....	1,900	12,163	30	22	....	26	26	....
35	Knitting works	1	13	42	....	15	45	....	14,513	15,833	48	4	....	45	4	3
36	Laundries	6	35	61	....	40	63	....	35,181	38,341	52	....	....	52	....	....
37	Linseed oil manufactory	1	20	....	....	14	....	....	9,000	6,093	42	....	10	30	22	....
38	Merchant tailors	3	57	9	....	47	2	....	24,643	24,405	39	11	2	39	11	2
39	Millinery, retail	1	....	20	3	2	31	4	3,421	6,100	52	....	....	52	....	....
40	Millinery, wholesale	1	26	50	8	26	51	8	26,352	28,765	52	....	....	52	....	....
41	Milling, grain and feed	2	16	....	....	15	....	....	4,800	4,575	35	....	17	35	....	17
42	Monuments, stone and bronze	8	25	2	1	25	2	1	10,699	10,042	27	16	9	27	16	9
43	Newspapers, printing and binding	21	466	79	35	352	87	33	239,252	217,883	52	....	....	50	2	....
44	Painters and paper hangers	6	100	1	9	81	2	2	39,319	34,521	29	19	4	20	22	1
45	Peanut and coffee roaster manufactory	1	12	....	....	11	....	....	6,661	5,798	52	....	....	26	26	....
46	Patent medicine manufactory	1	29	44	....	33	47	....	29,081	31,725	52	....	....	52	....	....


BETTENDORF METAL WHEEL CO.

BETTENDORF METAL WHEEL CO., DAVENPORT.

47	Planing mills and lumber manufactories	5	87	....	....	86	....	....	49,788	49,503	30	17	5	25	20	7
48	Plumbers, steam and gas fitters	3	84	....	....	29	9	9	19,191	16,554	35	17	....	35	17	....
49	Pork packers	2	105	1	....	114	1	....	56,919	59,854	37	15	....	46	6	....
50	Pump and windmill manufactories	2	20	....	....	21	....	....	11,464	14,350	52	....	....	52	....	....
51	Saddlery and harness manufactories	2	38	1	....	49	1	....	15,739	20,872	48	4	6	31	14	6
52	Scale manufactory	1	5	....	1	5	....	1	2,800	1,650	52	....	....	45	7	....
53	Seeds, retail	1	13	13	....	10	9	....	9,525	8,816	26	26	....	26	26	....
54	Shirt manufactory	1	2	10	....	2	10	....	3,816	3,978	40	12	....	40	12	....
55	Shoes and boots, retail	4	24	3	....	31	5	....	15,417	20,401	52	....	....	52	....	....
56	Shoes and boots, wholesale	1	22	2	....	24	2	....	26,100	26,700	52	....	....	52	....	....
57	Soap manufactories	2	21	3	....	20	3	....	10,885	10,109	45	6	1	30	21	1
58	Soda water manufactory	1	7	1	2	6	1	....	2,500	2,090	26	26	....	30	22	....
59	Starch manufactory	1	89	30	....	137	45	....	46,005	68,898	52	....	....	52	....	....
60	Steam heating apparatus manufactory	1	12	2	2	....	....	....	9,532	....	40	12	....	....	....	....
61	Stone, cut and rough, retail	1	23	1	1	....	....	....	976	....	13	....	39	....	....	....
62	Street railway, electric	1	196	....	....	196	....	....	101,296	105,978	52	....	....	52	....	....
63	Suspender manufactories	2	17	23	....	14	26	....	12,191	11,810	46	2	4	44	6	2
64	Telephone operator	1	22	50	....	22	50	....	40,219	40,219	52	....	....	52	....	....
65	Tent and awning manufactory	1	14	11	....	17	10	....	4,225	4,040	52	....	....	30	22	....
66	Transfer lines	4	73	1	....	67	1	....	34,987	31,807	26	26	....	30	22	....
67	Trunk manufactory	1	5	1	1	4	1	1	2,400	2,400	52	....	....	48	4	....
68	Typewriter manufactory	1	98	3	....	85	2	....	35,582	57,688	39	13	....	20	32	....
69	Vinegar and pickle manufactory	1	14	4	....	13	5	....	10,500	8,000	52	....	....	52	....	....
70	Water works	1	32	....	....	14	....	....	19,958	2,750	52	....	....	52	....	....
71	Wholesale butter and eggs	1	8	....	....	8	....	....	4,408	4,408	46	6	....	46	6	....
72	Wholesale coffee and spice	1	15	3	....	17	4	....	16,528	20,048	52	....	....	52	....	....
73	Wholesale drugs	3	40	3	....	11	2	....	30,452	9,038	52	....	....	52	....	....
74	Wholesale fruit and confections	2	23	2	....	29	7	....	20,760	25,077	52	....	....	52	....	....
75	Wholesale hides, tallow and wool	1	6	....	....	6	....	....	4,000	3,500	40	....	12	40	....	12
76	Wholesale oils	1	22	....	....	24	....	....	18,780	21,284	52	....	....	52	....	....
77	Wholesale paper	2	24	....	....	24	....	....	20,060	20,036	52	....	....	52	....	....
78	Wire fence manufactory	1	9	....	....	10	....	....	3,300	4,200	24	16	10	40	....	12
79	Woolen mill	1	38	38	....	30	30	....	27,500	17,763	45	....	7	44	....	8
	Total	226	4,449	899	108	4,765	918	102	$ 2,442,702	$ 2,458,831						
	Average	....	....	....	....	....	....	....	....	....	44	6	2	41	9	2

POTTAWATTAMIE COUNTY.

1	Agricultural implement manufactories	3	27	4	....	26	2	....	$ 25,162	$ 24,720	52	....	....	51	1	....
2	Agricultural implements, wholesale and retail	9	121	11	....	130	13	....	100,113	110,412	45	7	....	42	10	....
3	Brick and tile manufactories	3	42	1	....	37	1	....	7,507	8,480	21	13	18	28	2	22
4	Carriage and wagon manufactories	2	65	4	....	55	2	....	24,526	15,214	26	26	....	20	30	2
5	Cigar manufactory	1	6	....	2	5	....	1	2,000	2,500	48	4	....	45	7	....
6	Cigars, wholesale	1	13	....	....	12	....	....	13,420	10,920	52	....	....	52	....	....
7	Clothing, retail	1	6	....	....	6	1	....	9,643	7,606	52	....	....	52	....	....
8	Coal and lime, retail	1	12	....	....	....	....	....	3,500	....	52	....	....	....	....	....
9	Confectionery manufactories	2	9	6	....	27	13	....	938	13,814	10	....	42	45	6	1
10	Contractors and builders	4	171	....	....	120	....	....	31,500	25,000	21	5	26	18	7	27

POTTAWATTAMIE COUNTY—Continued.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	Females.	Apprentices.	NO. EMPLOYED, 1896. Males.	Females.	Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	Short time, reduced force.	Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	Short time, reduced force.	Suspended.
11	Dry goods, retail	2	32	32		32	33		$ 31,521	$ 31,860	52			52		
12	Foundry and machine shop	1	10			12			4,825	6 300	36	16		52		
13	Gas and electric light	1	15			15			10,437	11,461	52			52		
14	Grocery, retail	1	9	1		9	2	2	6,0[illegible]6	6,266	52			52		
15	Groceries, wholesale	2	28			28			22,750	20,750	52			52		
16	Hardware, retail	1	25	1		18	1		3,778	4,068	26	26		26	26	
17	Hardware, wholesale	2	45	1		43	1		37,610	38,320	52			52		
18	Hotels and restaurants	6	86	66		80	46		37,660	35,254	52			52		
19	Laundries	3	24	50		24	54		21,900	23,500	52			52		
20	Lumber, retail	2	10			10			5,679	5,627	52			52		
21	Merchant tailors	3	22	1		12	2		13,557	7,600	25	27		26	26	
22	Milling, grain and feed	3	26			29			17,287	17,654	40	5	7	45	5	2
23	Newspapers, printing and binding	2	71	2	5	66	4	7	43,000	41,068	52			52		
24	Painter and paperhanger	1	10			10			5,000	5,000	18	34		18	34	
25	Patent medicine manufactory	1	2	3					2,000		52					
26	Plumbers and steam heatings	2	5		2	14		4	2,952	5,152	52			52		
27	Scales manufactory	1	12	1	3	11	1	3	5,000	3,800	52			52		
28	Transfer line	1	9			10			4,500	5,000	52			52		
29	Water works	1	10			16			7,584	10,000	52			52		
30	Wholesale crockery	1	18	1		13	1		10,080	10,097	52			52		
31	Wholesale drugs	1	10			11			10,000	10,000	52			52		
32	Wholesale fruits	2	11	2		8	2		6,932	4,500	52			52		
33	Wholesale paints	1				5				2,580				52		
	Total	68	958	187	12	894	179	17	$ 528,461	$ 524,548						
	Average										45	5	2	46	5	1

POWESHIEK COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	Females.	Apprentices.	NO. EMPLOYED, 1896. Males.	Females.	Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	Short time, reduced force.	Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	Short time, reduced force.	Suspended.
1	Brick manufactory	1	7			6			$ 1,400	$ 1,000	24		28	17	4	31
2	Carriage and wagon manufactory	1	91	3		95	3		45,008	45,857	40	12		40	12	
3	Contractors and builders	2	26			9			12,728	8,708	33	11	8	20	30	
4	Dry goods, retail	1	2	3		2	3		2,500	2,540	52			52		
5	Glove and mitten manufactory	1	30	15		33	17		17,870	16,813	40	12		12	40	
6	Hotels	5	22	22		18	24		9,090	8,987	52			52		

7	Laundry	1	1	4	....	1	4	....	1,600	1,500	52	....	....	52	....	....
8	Meat market	1	5	....	....	7	1	....	2,100	3,500	52	....	....	52	....	....
9	Newspaper and printing	1	7	7	....	7	5	....	5,200	4,621	32	20	....	39	13	....
	Total	14	191	54	....	178	57	....	$ 97,491	$ 88,481						
	Average	....	....	....	....	....	....	....	....	....	43	6	4	37	11	4

RINGGOLD COUNTY.

1	Brick manufactory	1	8	....	....	9	....	....	$ 1,660	$ 1,575	26	....	26	30	....	22
2	Newspaper and printing	1	3	3	....	3	3	....	1,500	1,500	52	....	....	52	....	....
	Total	2	11	3	....	12	3	....	$ 3,160	$ 3,075						
	Average	....	....	....	....	....	....	....	....	....	39	....	13	41	....	11

SCOTT COUNTY.

1	Agricultural implement manufactories	2	156	....	....	6	....	....	$ 57,675	$ 2,500	40	3	9	52	....	....
2	Baker	1	9	2	....	9	2	....	5,200	5,200	52	....	....	52	....	....
3	Boots and shoes, retail	1	5	1	1	5	1	1	2,841	2,912	52	....	....	52	....	....
4	Boots and shoes, wholesale	1	5	....	....	5	1	....	3,488	2,992	52	....	....	52	....	....
5	Box and paper bag manufactory	1	5	2	....	....	....	....	3,000	....	52	....	....	....	....	....
6	Brick and tile manufactories	3	47	....	....	42	....	....	13,681	11,439	21	1	31	9	15	28
7	Broom manufactory	1	22	8	6	25	5	....	10,345	8,393	45	6	1	....	48	4
8	Candy and cracker manufactory	1	59	57	3	86	42	3	26,136	43,582	42	10	....	38	14	....
9	Canning vegetables	1	65	185	....	115	225	....	7,087	6,588	3	2	47	3	2	47
10	Cigar manufactories	3	88	181	5	73	200	5	78,574	73,466	34	17	1	38	13	1
11	Clothing manufactories	2	44	183	20	60	129	5	51,507	51,315	45	6	1	18	33	1
12	Clothing, retail	3	16	3	....	16	3	....	11,061	11,771	52	....	....	52	....	....
13	Coal mining	2	32	....	....	33	....	....	9,718	8,608	28	20	4	22	14	16
14	Contractor and builder	1	204	....	....	65	....	....	12,000	19,000	7	....	45	30	....	22
15	Cooperage	1	8	....	....	8	....	....	3,050	2,862	48	4	....	16	36	....
16	Cordage and twine manufactory	1	7	....	1	5	....	....	1,889	735	39	13	....	....	36	16
17	Drugs, retail	1	6	....	3	6	....	2	1,800	2,210	52	....	....	52	....	....
18	Dry goods, retail	4	126	131	5	125	131	4	96,438	88,823	52	....	....	52	....	....
19	Dry goods, wholesale	2	49	48	....	43	41	....	33,624	31,228	52	....	....	52	....	....
20	Foundries and machine shops	5	217	....	7	203	....	6	111,619	101,165	42	10	....	43	9	....
21	Furniture manufactories	2	59	....	3	40	....	4	20,477	16,550	35	14	3	7	44	1
22	Furniture, retail	4	27	4	....	29	3	....	16,290	17,662	52	....	....	52	....	....
23	Gas and electric lights	3	37	2	....	46	2	....	35,819	40,000	52	....	....	52	....	....
24	Hardware, retail	1	7	....	....	7	....	....	2,900	2,862	52	....	....	52	....	....
25	Hardware, wholesale	1	21	3	....	24	3	....	19,508	18,760	52	....	....	52	....	....
26	Harness and saddle manufactories	2	23	....	3	12	....	....	9,500	6,126	47	5	....	32	20	....
27	Hotels	4	52	56	....	52	56	....	29,596	25,520	52	....	....	52	....	....
28	Insurance (fire and life)	3	28	3	....	30	3	....	28,298	36,097	52	....	....	52	....	....
29	Ice and cold storage	1	7	....	....	21	....	....	2,803	10,426	13	26	13	52	....	....
30	Laundries	3	11	26	....	10	26	....	11,402	11,580	52	....	....	52	....	....
31	Macaroni manufactory	1	17	30	....	15	40	....	8,417	10,684	26	26	....	26	26	....

SCOTT COUNTY—CONTINUED.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
32	Malters, grains and milling	5	63	4		44	4		$ 36,929	$ 32,226	39	5	8	39	11	2
33	Mineral water manufactory	1	5						2,230		30	22				
34	Monuments and granite	1	10		2	11		2	8,290	4,768	52			46	6	
35	Newspapers, printing and binding	7	126	12	14	103	12	14	72,450	74,064	52			52		
36	Paint manufactory	1	13	2		11	3		4,730	8,463	40	12		30	22	
37	Plumbing and steam heating	1	25		10	19		7	9,220	8,476	42	10		33	19	
38	Pump and mill supplies manufactory	1	33	2	9	19	1		12,000	10,000	52			26	14	12
39	Sash, door, blind and lumber manufactories	2	191			142			68,408	48,261	35	17		30	22	
40	Soap manufactory	1	6			5			2,100	2,200	48	4		46	6	
41	Steel, iron, hardwood, etc., manufactories	2	27			25			20,900	21,280	52			52		
42	Street railway (electric)	1	70			155		1		86,327				52		
43	Syrup manufactory	1	370	2		285	2		117,280	85,000	38	14		42	10	
44	Telephone operators	2	4	11		12	21		6,510	13,925	52			52		
45	Transfer lines	2	15			10			6,100	5,200	52			52		
46	Vinegar and pickling works	1	19			19	5		17,875	16,480	52			52		
47	Water-works	1	15			20			15,100	16,363	52			52		
48	Wholesale coffee and spices	1	21	9		21	8		22,000	24,632	52			52		
49	Wholesale crockery and glassware	2	18	4		19	4		12,684	12,720	52			52		
50	Wholesale fruits	1	14	3		12	3		10,400	11,645	52			52		
51	Wholesale groceries	3	54	2		54	2		45,606	45,685	52			52		
52	Wholesale oils	1	15			14			11,525	11,000	52			52		
53	Wood boxes (cigars)	1	13	17		14	16		10,200	9,900	52			52		
	Total	101	2,515	943	92	2,233	994	54	$ 1,237,255	$ 1,221,661						
	Average										44	5	3	41	8	3

SIOUX COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	NO. WEEKS IN OPERATION, 1895. Short time, reduced force.	NO. WEEKS IN OPERATION, 1895. Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
1	Brick and tile manufactories	2	24			8			$ 4,865	$ 730	23	5	24	4		48
2	Hotels	2	3	9		3	9		1,560	2,066	39		13	52		
3	Milling, grain and flour	2	14			14			11,767	7,780	31	21		37	15	
	Total	6	41	9		25	9		$ 18,192	$ 10,576						
	Average										31	9	13	31	5	16

STORY COUNTY.

1	Brick and tile manufactories	3	24	....	....	6	....	....	$ 4,471	$ 1,300	24	....	28	16	4	33
2	Dry goods, retail	2	1	4	....	4	7	....	1,860	8,430	52	....	....	52	....	....
3	Hotel	1	1	4	....	1	4	....	892	892	52	....	....	52	....	....
4	Wholesale butter and eggs	1	28	....	....	26	....	....	18.000	12,500	36	16	....	36	16	....
5	Wire fence manufactory	1	7	....	....	....	....	....	1,160	....	10	42	....	....	....	....
	Total	8	61	8	....	37	11	....	$ 21,383	$ 18,122						
	Average	....	....	....	....	....	....	....	....	....	35	11	6	39	5	8

TAMA COUNTY.

1	Brick and tile manufactories	4	50	....	....	41	....	....	$ 12,105	$ 10,088	32	3	17	26	1	25
2	Foundry and machine shop	1	6	....	....	....	....	....	1,550	....	32	20	....	....	....	....
3	Hotel	1	4	6	....	4	6	....	1,760	1,800	52	....	....	52	....	....
4	Milling and broom manufactory	1	11	....	....	11	....	....	4,600	4,000	52	..	....	34	18	....
5	Strawboard and egg case filler manufactory	1	20	30	....	60	100	....	12 000	28,787	30		22	42	....	10
	Total	8	91	36	....	116	106	....	$ 32,015	$ 44,675						
	Average	....	....	....	....	....	....	....	....	....	39	5	8	39	5	8

TAYLOR COUNTY.

1	Brick and tile manufactories	2	64	....	....	54	....	....	$ 11,083	$ 14,770	25	6	21	26	23	3
2	Newspaper, printing and binding	1	6	1	....	4	1	....	1,684	1,920	52	....	....	52	....	....
	Total	3	70	1	....	58	1	....	$ 12,767	$ 16 690						
	Average	....	....	....	....	....	....	....	....	....	38	3	11	39	12	1

UNION COUNTY.

1	General stores	4	17	1	....	18	5	....	$ 9.280	$ 10,160	52	....	....	52	....	....
2	Hotels	2	8	15	....	8	14	....	4,·02	3,917	52	....	....	52	....	....
3	Laundry	1	2	3	....	2	3	....	1,152	1,152	52	....	....	52	....	....
4	Marble and granite	1	6	1	2	7	1	3	1,800	2,900	52	....	....	32	20	....
5	Newspaper, printing and binding	1	8	5	2	....	....	....	2.552	....	52	....	....	....	....	....
6	Wholesale grocery	1	5	....	....	7	....	....	2,220	3,263	52	....	....	52	....	....
	Total	10	46	25	4	42	23	3	$ 21,506	$ 21,392						
	Average	....	....	....	....	....	....	....	....	....	52	....	....	48	4	....

VAN BUREN COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895.			NO. EMPLOYED, 1896.			Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895.			NO. WEEKS IN OPERATION, 1896.		
			Males.	Females.	Apprentices.	Males.	Females.	Apprentices.			Full time, full force.	Short time, reduced force.	Suspended.	Full time, full force.	Short time, reduced force.	Suspended.
1	Cigar manufactory	1	12	....	2	12	....	2	$ 3,750	$ 3,784	32	30	....	50	..	2
2	Coal mining	1	10	....	..	8	....	....	3,600	3,360	42	o10	....	36	16	....
3	Woolen mill	1	36	33	..	28	25	....	17,152	13,160	34	18	....	32	20	....
	Total	3	58	33	2	48	25	2	$ 24,502	$ 20,304						
	Average	....	....	....	....	....	....	....	....	....	36	16	....	39	12	1

WAPELLO COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895.			NO. EMPLOYED, 1896.			Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895.			NO. WEEKS IN OPERATION, 1896.		
			Males.	Females.	Apprentices.	Males.	Females.	Apprentices.			Full time, full force.	Short time, reduced force.	Suspended.	Full time, full force.	Short time, reduced force.	Suspended.
1	Bag (paper) manufactory	1	5	10	....	....	....	....	$ 2,600	....	26	10	16	....	....	....
2	Boots and shoes, retail	1	4	1	....	5	1	....	2,340	$ 2,860	12	....	....	52	....	....
3	Brick manufactory	1	40	....	....	....	....	....	6,296	....	26	....	26	....	....	....
4	Carriage and wagon manufactories	2	16	....	....	12	....	....	4,811	4,811	18	34	....	18	34	....
5	Cigar manufactories	9	75	78	3	60	68	8	49,781	42,634	37	14	1	44	6	2
6	Clothing, retail	1	7	....	....	6	....	....	4,160	8,780	52	....	....	52	....	....
7	Coal mining	9	546	....	....	575	1	....	206,678	192,077	26	19	7	24	19	9
8	Cooperage	1	35	....	....	....	....	....	10,560	....	34	18	....	....	....	....
9	Dry goods, retail	4	25	25	1	22	27	1	20,381	21 494	52	....	....	52	....	....
10	Flour and grain, retail	1	....	....	....	5	....	....	....	2,468	....	....	....	52	....	....
11	Foundries and machine works	4	122	1	....	117	16	....	53,879	54,226	28	24	....	21	30	1
12	Furniture, retail	1	7	....	....	8	....	....	3,100	3,100	52	....	....	....	52	....
13	Gas manufactory	1	6	....	....	6	....	....	4,035	3,925	52	....	....	52	....	....
14	General merchandise store	1	6	11	2	8	16	2	5 460	7,280	52	....	....	52	....	....
15	Hotels and restaurants	5	34	41	..	36	37	....	15 129	15 954	52	....	....	52	....	....
16	Ice, retail	3	54	....	....	54	....	....	5,937	6,187	26	26	....	26	26	....
17	Laundries	2	18	42	....	18	43	....	18,846	18,576	26	26	....	26	26	....
18	Linseed oil manufactory	1	12	....	....	12	....	....	1,942	3,156	22	....	30	30	....	22
19	Newspapers, printing and binding	3	30	5	4	25	5	1	20,919	18,849	46	6	....	51	1	....
20	Pickle manufactory	1	4	4	....	3	5	....	2,000	3,000	12	40	....	20	32	....
21	Planing mill	1	5	....	....	6	....	....	1,500	1,600	....	52	....	....	52	....
22	Plumbing and steam heating	1	9	1	..	8	1	....	1,292	1,114		48	4	..	48	4
23	Pork packers	1	535	....	....	600	....	....	210,000	216,000	12	40	....	20	32	....
24	Sewing machine attachment manufactory	1	67	125	....	67	125	....	56,800	56,800	..	52	....	....	52	....
25	Street railway, electric	1	60	....	....	47	....	....	28,906	24,827	52	....	....	52	....	....

26	Telephone operator	1	2	4	.....	2	4	.....	$2,066	$2,074	52	.....	.....	52	.....	.....
27	Transfer lines	2	37	.....	.....	36	.....	.....	17,264	15,900	52	.....	.....	52	.....	.....
28	Water works	1	8	1	.....	7	1	.....	6,558	6,054	52	.....	.....	52	.....	.....
29	Wholesale beer	1	8	.....	.....	10	.....	.....	3,200	4,000	42	.....	10	42	.....	10
30	Wholesale butter and eggs	2	32	.....	.....	33	.....	.....	14,240	14,435	32	20	.....	32	20	.....
31	Wholesal confectionery	1	10	10	.....	15	15	.....	5,000	5,000	48	4	.....	48	4	.....
32	Wholesale drugs	1	21	3	.....	22	3	.....	16,892	18,362	52	.....	.....	52	.....	.....
33	Wholesale fruits	1	6	.....	.....	6	.....	.....	5,496	2,563	52	.....	.....	26	26	.....
34	Wholesale groceries	2	32	2	.....	34	2	.....	28,484	26,8.0	52	.....	.....	52	.....	.....
35	Wholesale hardware	2	31	.....	.....	33	.....	.....	17,500	19,550	52	.....	.....	52	.....	.....
36	Wholesale hides and tallow	1	8	.....	.....	6	.....	.....	5,002	4,104	52	.....	.....	52	.....	.....
37	Wholesale poultry and cooperage	1	25	25	.....	30	55	.....	5,200	9,600	15	37	.....	26	26	.....
	Total	73	1,982	384	10	1,935	370	12	$854,493	$832,000						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	36	18	8	37	14	1

WARREN COUNTY.

1	Coal mines	4	44	.....	.....	36	.....	.....	$7,986	$9,000	21	7	14	21	18	18
2	Dry goods, retail	2	14	4	2	14	4	2	10,000	8,600	52	.....	.....	52	.....	.....
3	Hotel	1	2	3	.....	2	3	.....	300	300	52	.....	.....	52	.....	.....
4	Lumber and grain	1	6	.....	.....	6	.....	.....	3,000	2,700	36	16	.....	36	16	.....
5	Suspender manufactory	1	6	2	.....	7	2	.....	1,400	1,600	35	17	.....	35	17	.....
	Total	9	72	9	2	65	9	2	$22,686	$23,200						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	39	8	5	39	10	3

WASHINGTON COUNTY.

1	Brick and tile manufactory	1	8	.....	.....	8	.....	.....	$1,500	$1,895	18	14	20	30	.....	28
2	Carriage and wagon manufactory	1	10	.....	2	8	.....	.....	4,739	3,873	52	.....	.....	40	12	.....
3	General merchandise store	1	2	3	.....	2	3	.....	2,400	2,078	52	.....	.....	52	.....	.....
4	Hotels	2	7	15	.....	8	18	.....	4,488	4,394	52	.....	.....	52	.....	.....
5	Newspaper, printing and binding	1	5	1	.....	5	1	.....	1,820	1,600	52	.....	.....	52	.....	.....
	Total	6	32	19	2	31	17	.....	$14,947	$14,040						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	45	3	4	45	2	5

WAYNE COUNTY.

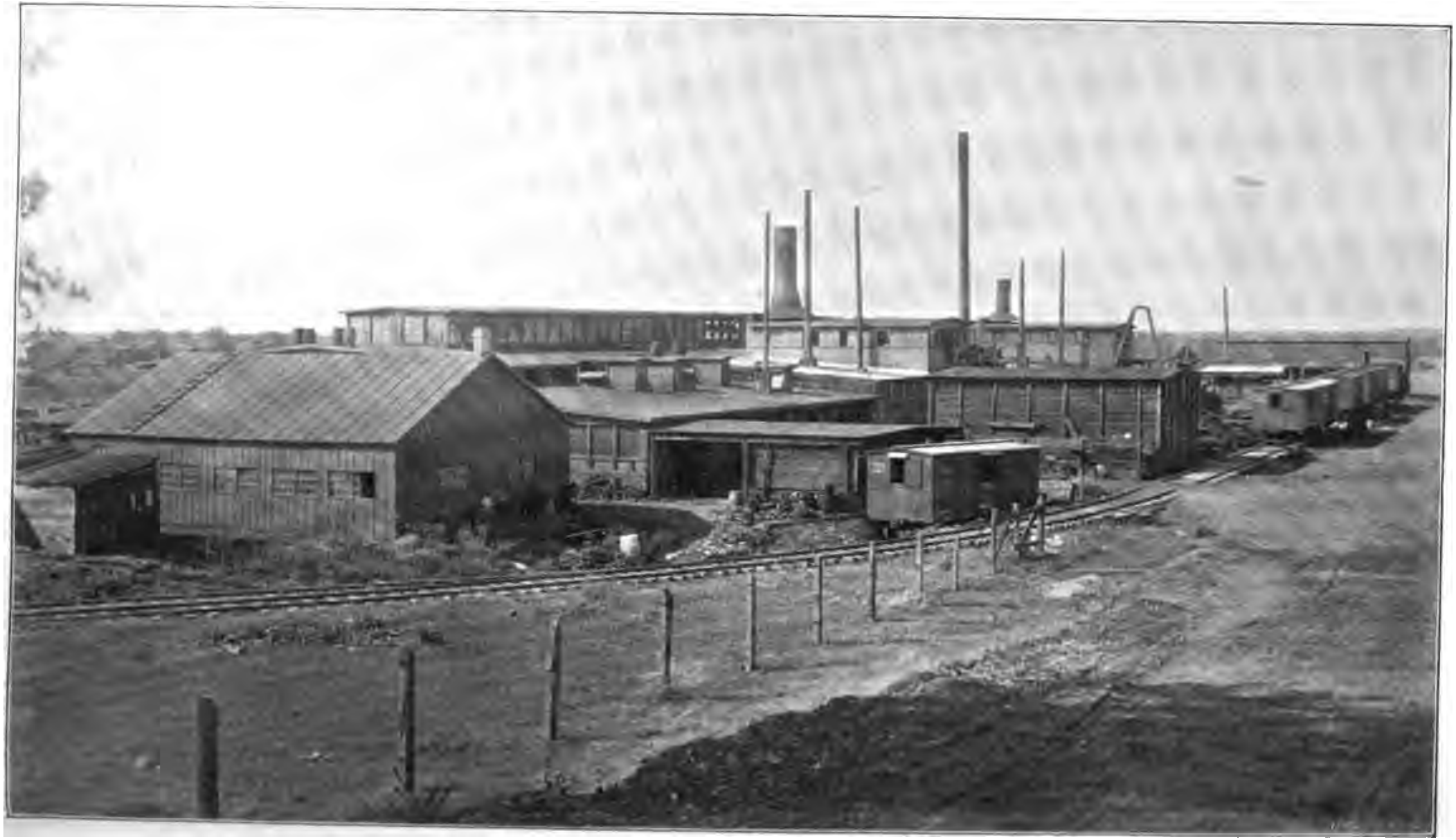
1	Brick and tile manufactory	1	8	.....	.....	10	.....	.....	$2,400	$2,000	26	26	.....	26	.....	26
2	Coal mining	1	166	.....	.....	218	.....	.....	54,390	56,078	20	1	31	22	1	29
	Total	2	174	.....	.....	228	.....	.....	$56,790	$58,078						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	23	13	16	24	1	27

WEBSTER COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	Females.	Apprentices.	NO. EMPLOYED, 1896. Males.	Females.	Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO WEEKS IN OPERATION, 1895. Full time, full force.	Short time, reduced force.	Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	Short time, reduced force.	Suspended.
1	Agricultural implements, retail	1	8			9			$ 4,000	$ 4,500	52			52		
2	Bottler	1	5						2,600		52					
3	Brick and tile manufactories	4	91			96			23,778	26,733	22	16	14	18	15	19
4	Clothing and tailoring	3	42	5	2	40		2	21,763	20,372	44	8		52		
5	Coal mining	7	326			291			114,736	112,908	24	23	5	23	22	7
6	Contractor and builder	1	8			11			4,000	3,800	36	16		10	24	18
7	Dry goods	1	3	2		3	2		2,000	2,000	52			52		
8	Foundry and machine works	1	6			6			3,107	2,493	52			7	45	
9	Gas and electric light	1	5			9	1		3,000	5,000	52			52		
10	Hotels	3	9	21		13	20		5,826	6,226	52			52		
11	Laundry	1	3	14		4	16		4,494	5,017	20	32		20	32	
12	Newspapers, printing and binding	4	25	11	2	33	10	2	11,630	12,804	51	1		52		
13	Oatmeal manufactory	1	20	6	1	25	10		10,000	12,500	50		2	50	2	
14	Planing mill	1	15			12		2	7,600	7,741	48	4		48	4	
15	Plumbing and steamfitting	1	14						7,000		52					
16	Shoe manufactory	1				45	55			30,000				50		2
17	Stoneware manufactory	1	20			20			5,511	7,478	30	11	11	46	6	
18	Stucco and calcimined plaster manufactories	2	97	1		72	1		38,270	39,130	13	39		32	20	
19	Transfer line	1				7				3,750				52		
20	Wholesale fruits	1	7	2		7	3		6,386	6,878	52			52		
21	Wholesale grocery	1	16	1		16	2		16,520	14,795	52			52		
22	Wholesale hardware	1	10			10			8,244	8,244	52			52		
	Total	39	730	63	5	729	120	6	$ 300,465	$ 332,434						
	Average										43	8	1	41	9	2

WINNEBAGO COUNTY.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	Females.	Apprentices.	NO. EMPLOYED, 1896. Males.	Females.	Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO WEEKS IN OPERATION, 1895. Full time, full force.	Short time, reduced force.	Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	Short time, reduced force.	Suspended.
1	Flax and flour mill	1	6			6			$ 2,106	$ 1,6[illegible]0		52			52	
2	Hotel	1	2	7		2	7		1,560	1,560	52			52		
	Total	2	8	7		8	7		$ 3,666	$ 3,200						
	Average										26	26		26	26	



MURRAY IRON WORKS, BURLINGTON.

WINNESHIEK COUNTY.

1	Clothing, retail	1	7	....	....	6	....	....	$ 4,000	$ 3,800	52	......	....	52	......	......
2	General merchandise	3	8	14	...	9	15	....	9,319	9,446	52	.....	......	52	......	......
3	Hotels	2	5	18	....	7	18	.. ..	8,400	3,415	52	......	.....	52	.....	.....
4	Newspapers, printing and binding	2	39	7	6	37	8	6	25,564	24,1[illegible]4	52	....	......	52	......	......
5	Sash, door and blind manufactory	1	26	....	....	25	.....	.....	9,2[illegible]5	11,000	43	10	......	40	10	3
6	Wagon and carriage manufactory	1	13	....	1	12	.. .	1	6,000	4,199	40	12	......	35	17	.....
7	Wind mill manufactory	1	24	1	3	20	1	.....	8,000	6,346	42	10	......	40	10	2
	Total	11	122	40	10	116	42	7	$ 65,568	$ 62,360						
	Average	....	....	....	....		....	....	....	....	48	4	......	46	5	1

WOODBURY COUNTY.

1	Agricultural implement manufactory	1	12	....	....	14	.. ..	....	$ 6,609	$ 4,641	26	26	......	26	26	.....
2	Agricultural implements, retail	1	6	....	....	6	....	....	4,090	4,190	52	......	......	52	.....	...
3	Baker	1	7	....	....	7	1	....	3,160	3,750	52	......	.....	52	...	......
4	Bottling of mineral water	1	7	....	....	7	.	....	2,800	2,800	26	26	....	26	26	......
5	Box (paper) manufactory	1	3	15	....	4	16	....	2,500	2,100	40	12	....	..	52	......
6	Brick and tile manufactories	5	162	....	.. .	135	....	....	31,342	23,006	17	4	31	13	16	23
7	Cigar manufactories	3	28	....	2	27	.. .	2	20,418	17,957	50	1	1	47	5	.....
8	Cigars, wholesale	1	8	....	....	7	.. .	....	6,826	11,514	52	.. .	.....	52	......	.....
9	Clothing manufactory	1	5	45	....	8	62	....	10,000	15,400	51	....	1	51	......	1
10	Clothing, retail	4	41	1	....	42	3	....	28,710	30,699	52	.	.....	52	......	.....
11	Coal, ice and wood, retail	4	21	1	....	47	2	....	10,730	17,800	43	9	....	38	14	......
12	Contractors, sewers and buildings	3	70	....	....	80	....	... .	27,400	15,000	31	21	.....	26	16	10
13	Cooperage manufactory	1	8	.. .	.. .	8	...	....	2,688	3,024	34	18	....	42	...	10
14	Cracker and candy manufactory	1	36	34	...	40	34	... .	26,468	32,434	30	22	... ..	34	18	......
15	Dry goods, retail	7	118	111	....	145	119	....	97,181	121,841	52	.....	......	52	......	......
16	Dry goods, wholesale	1	16	1	....	16	1	.. ..	13,000	13,000	52	......	......	52	......	.....
17	Electric supply manufactory	1	5	1	...	4	1	....	4,497	4,047	52	.....	.....	52	......	.....
18	Florist	1	8	....	....	8	....	....	3,036	3,016	52	......	......	52	......	.....
19	Foundries and machine shops	3	134	....	....	10	....	1	68,214	4,801	47	5	......	37	15	......
20	Gas and electric light	....	.....	.. .	....	..	.. .	....	....	....	....	......	.....	......	......	......
21	Groceries, retail	3	27	3	... .	23	3	....	15,776	14,416	52	.....	......	52	......	... .
22	Groceries, wholesale	4	143	4	....	157	16	....	109,425	131,217	52	......	......	52	......	......
23	Hotels and restaurants	10	121	87	....	109	82	....	56,675	47,637	52	......	......	52	......	......
24	Insurance (life)	1	9	....	....	16	....	....	7,503	13,504	52	......	......	52	......	......
25	Jeweler, retail	1	7	....	....	6	....	....	6,500	5,400	52	..	.....	52	......	......
26	Laundries	2	8	11	....	7	14	....	1,080	6,812	26	26	.....	40	12	... ..
27	Mattress, tent and awning manufactory	1	7	4	....	7	4	....	3,957	4,835	26	26	......	26	26	......
28	Merchant tailors	3	22	1	....	22	1	....	14,019	12,471	34	18	....	34	18	......
29	Milling, flour and grain	4	76	12	....	64	9	....	46,502	35,983	29	19	4	39	9	4
30	Newspapers, printing and binding	4	184	23	4	190	17	6	109,514	132,198	52	......	.. ..	52		......
31	Nursery and seed store	1	15	10	....	20	25	....	13,000	8,000	10	42	......	13	26	13
32	Painters and paperhangers	2	25	1	2	26	1	2	8,250	5,250	13	39	......	13	39	......
33	Plumber and steam fitter	1	5	....	....	3	2	....	3,671	880	52	......	......	.....	52	......
	Pork packer	1	250	....	25	320	....	35	76,833	98,086	33	20	......	44	......	8

WOODBURY COUNTY—CONTINUED.

Line No.	KIND OF BUSINESS.	No reporting.	NO. EMPLOYED, 1895.			NO. EMPLOYED, 1896.			Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895			NO WEEKS IN OPERATION, 1896.		
			Males.	Females.	Apprentices.	Males.	Females.	Apprentices.			Full time, full force.	Short time, reduced force.	Suspended.	Full time, full force.	Short time, reduced force.	Suspended.
35	Saddle and harness manufactories	2	16	.....	1	24	.....	1	$ 5,147	$ 7,200	30	22	.....	30	22	.....
36	Sash, door and blind manufactory	1	50	.....	.....	35	.....	.....	20,188	18,857	36	8	8	48	.....	4
37	Sewer pipe manufactory	1	60	.....	.....	55	.....	.....	14,396	7,830	31	.....	21	14	2	36
38	Soap manufactory	1	13	10	.....	11	5	.....	6,648	5,762	41	11	.....	52	.....	.....
39	Starch manufactory	1	26	20	.....	35	25	.....	8,717	20,582	38	.....	14	52	.....	.....
40	Stockyard, feeding and shipping stock	1	43	1	.....	42	.....	.....	26,708	29,306	52	.....	.....	52	.....	.....
41	Street railways (electric)	5	122	.....	.....	131	.....	.....	72,240	71,878	52	.....	.....	52	.....	.....
42	Tannery	1	10	5	.....	7	3	.....	6,000	5,0[illegible]0	52	.....	.....	52	.....	.....
43	Telephone operators	2	26	30	.....	16	30	.....	17,0[illegible]8	20,520	26	26	.....	52	.....	.....
44	Transfer and transportation lines	8	52	.....	.....	53	.....	.....	19,892	19,706	43	9	.....	43	9	.....
45	Vinegar and pickle manufactory	1	13	2	.....	14	2	.....	8,729	9,864	52	.....	.....	52	.....	.....
46	Water works	1	12	.....	.....	12	.....	.....	9,280	9,2[illegible]0	52	.....	.....	52	.....	.....
47	Wholesale butter and eggs	1	13	7	.....	24	9	.....	11,754	14,060	52	.....	.....	52	.....	.....
48	Wholesale drugs	2	33	5	.....	37	5	.....	20,190	29,323	52	.....	.....	52	.....	.....
49	Wholesale fruits and commission	2	31	1	.....	27	1	.....	21,810	17,850	52	.....	.....	52	.....	.....
50	Wholesale hardware	3	56	5	.....	70	5	.....	43,220	54,476	52	.....	.....	52	.....	.....
51	Wholesale lime and cement	1	8	.....	.....	8	.....	.....	4,000	4,000	52	.....	.....	52	.....	.....
52	Wholesale liquors	3	22	.....	.....	22	.....	.....	14,860	14,590	52	.....	.....	52	.....	.....
53	Wholesale oils	1	18	1	.....	9	1	.....	10,960	8,400	52	.....	.....	52	.....	.....
54	Wholesale toys and stationery	1	10	2	.....	10	2	.....	7,050	6,125	52	.....	.....	52	.....	.....
	Total	112	2,222	454	34	2,237	501	47	$ 1,190,518	$ 1,220,585						
	Average	.....			.....	.....			.....	.....	43	8	1	42	8	2

WORTH COUNTY.

Line No.	KIND OF BUSINESS.	No reporting.	Males.	Females.	Apprentices.	Males.	Females.	Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	Full time, full force.	Short time, reduced force.	Suspended.	Full time, full force.	Short time, reduced force.	Suspended.
1	Agricultural implements, retail	1	12	.....	.....	10	.....	.....	$ 4,600	$ 4,200	52	.....	.....	52	.....	.....
2	Hotel	1	.....	5	.....	.....	5	.....	640	500	52	.....	.....	52	.....	.....
3	Wagon and sleigh manufactory	1	6	.....	.....	6	.....	.....	2,550	2,000	50	.....	2	40	12	.....
	Total	3	18	5	.....	16	5	.....	$ 7,790	$ 6,700						
	Average	.....	.....	.....	.....	.....	.....	.....	.....	.....	51	.....	1	48	4	.....

WRIGHT COUNTY.

1	Brick and tile manufactory	1	6	.	. . .	6	. . .	.....	$ 1,200	$ 800	12		40	12	....	40
2	Hotel	1	3	10	. . .	3	10	....	2,400	2,400	52	.. ..	......	52	..	....
3	Newspaper, printing and binding	1	4	1	1	4	1	1	1,750	1,750	52	......	......	52	.....	.....
	Total	3	13	11	1	13	11	1	$ 5,350	$ 4,750						
	Average	.. .	.....	.. .	.....	.....	.....	.....	....	....	39	.....	13	39	.....	13

RECAPITULATION OF THE ENTIRE STATE.

1	Agricultural implement manufactories	16	*567	5	7	*402	4	2	$ 192.837	$ 113,410	34	13	5	30	15	7
2	Agricultural implements, retail	20	232	21	5	256	22	8	197,143	198,340	51	1	.....	50	2	.. ..
3	Art glass and show case manufactory	1	5	2	.....	4	1	.....	2,704	1,872	52	......	.....	.....	86	11
4	Bag (paper) manufactories	2	14	25	....	9	18	.....	10,985	10,002	39	5	8	52	......	......
5	Bakers	11	73	10	4	77	17	8	36,286	38,664	53	......	......	52	......	......
6	Barrel manufactory	1	12	....	.....	12	.	.... .	2,250	2,600	23	....	27	28	.....	24
7	Basket manufactories	2	47	48	....	60	38	....	17.836	15,860	28	14	15	32	14	6
8	Beer manufactories	7	110	....	.. .	112	.....	.....	68,610	66,835	52	.....	....	45	3	4
9	Bicycles, retail	2	12	.. ..	.....	10	.....	.....	4,370	1,000	44	4	4	16	36	.. .
10	Blacksmith	1	6	.....	.....	6	.....	.....	2,912	2.850	52	......	......	52	..	......
11	Boiler manufactories	8	42	2	7	30	.....	4	20,538	10,202	30	22	....	30	22	.....
12	Books and stationery, retail	1	7	.....	.....	7	.. .	.....	2.870	3,150	53	.....	....	53	.....	.....
13	Books and stationery, wholesale	1	14	1	....	12	1	.. .	9.500	4,100	40	12	....	20	32	..
14	Boot and shoe manufactories	6	218	164	27	243	218	35	152,966	184,416	41	4	7	38	4	10
15	Boots and shoes, retail	7	35	9	1	44	10	1	22,178	28,014	52	......	.....	52	.....	.....
16	Boots and shoes, wholesale	4	47	3	.....	51	4	.....	55,164	55,418	52	.....	......	52	......	......
17	Bottlers	10	81	5	3	61	4	11	37,129	30,943	38	14	....	37	15	.....
18	Box (paper and wood) manufactories	12	225	52	4	115	64	2	76.372	38.185	52	....	....	53	...	.....
19	Brass goods manufactory	1	74	1	.	70	.....	.....	20,648	12,760	46	6	......	....	52	.....
20	Brick and tile manufactories	121	1,878	3	5	1,713	3	5	440.590	321,499	21	8	23	16	7	29
21	Broom and brush manufactories	6	78	13	21	78	9	15	29.845	27,613	40	8	4	39	10	3
22	Button manufactory	1	20	40	....	40	100	.....	18.000	30,200	52	....	..	52	....	..
23	Canning vegetables	14	884	910	.....	883	879	....	60,875	46,924	6	7	39	5	11	36
24	Can (tin) manufactory	1	85	37	. .	99	53	.....	20,740	11,263	30	...	22	22	....	30
25	Carriage and wagon manufactories	27	1,831	20	8	1,146	16	5	371,851	282,012	36	15	1	39	22	1
26	Cigar manufactories	45	448	296	45	367	346	67	279,215	258,595	45	6	1	46	3	3
27	Cigars, wholesale	5	49	10	.. .	58	9	.. .	48,449	57,332	52	.....	....	52	...	
28	Clothing manufactories	14	263	1061	20	253	952	5	375,812	326,579	43	5	4	39	7	6
29	Clothing, retail	28	237	13	3	232	17	4	158.296	154,191	52	......	.....	52	......	..
30	Coal mining	151	10151	1	....	8,952	1	.....	3,592,029	3,257,215	23	15	14	23	15	5
31	Coal and ice, retail	22	337	3	.. .	520	.....	.....	83.411	98,663	40	12	....	38	14	.....
32	Coffin and casket manufactories	3	135	15	2	103	17	3	57 860	58,497	41	11	..	37	15	....
33	Cooperage manufactories	11	201	1	.....	149	.....	.....	64,941	50,477	33	9	10	34	15	3
34	Contractors and builders	24	790	.. .	1	655	.....	2	147,516	118,427	40	12	....	35	17	...
35	Cordage and twine manufactory	1	7	.. ..	1	5	.....	....	1,889	735	39	13			36	16
36	Cornice manufactories	2	15	.....	3	16	.....	2	$ 4.205	$ 4,765	30	22	......	30	22	...
37	Cracker and candy manufactories	14	322	280	9	341	264	9	200,435	208,908	37	13	2	33	16	3
38	Creamery supplies manufactories	3	49	2	7	70	4	3	22,790	24,561	44	8	.....	44	8	.....

RECAPITULATION—CONTINUED.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	Females.	Apprentices.	NO. EMPLOYED, 1896. Males.	Females.	Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895. Full time, full force.	Short time, reduced force.	Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	Short time, reduced force.	Suspended.
39	Crockery, retail	4	15	12	....	19	15	....	12,245	16,667	52	....	....	52	....	....
40	Crockery, wholesale	7	71	11	2	78	14	2	51,869	54,1[illegible]8	52	....		52	....	....
41	Ditcher manufactory	1	15	....	....	6	....	....	3,500	2,330	40	....	12	40	12	....
42	Drugs, retail	8	20	3	3	23	4	....	7,800	8,670	52	....	..	52	....	....
43	Drugs, wholesale	12	178	15	4	155	15	4	147,484	135,091	52	....	....	52	....	....
44	Dry goods, retail	77	684	689	18	747	728	19	576,271	623,030	52	....		52	..	....
45	Dry goods, wholesale	5	78	50	....	74	42	....	57,741	55,428	52	....	...	52	....	....
46	Egg case filler manufactories	3	24	51	105	200	....	....	17,010	47,143	14	38	....	34	10	8
47	Electric supplies manufactories	2	12	1	1	12	1	1	8,608	7,147	52	....	....	36	16	....
48	Engraver and electrotyper	1	8	....	2	9	....	....	4,535	5,235	52	....	....	52	....	....
49	Farm tool manufactories	3	47	2	....	42	1	....	15,236	12,937	38	12	2	38	12	2
50	Feather duster manufactory	1	19	34	....	15	22	....	9,245	8,173	32	18	8	24	19	9
51	Florist	1	8	....	....	8	....	....	3,036	3,036	52	....	....	52	....	....
52	Fire and life insurance	20	209	38	....	226	40	....	224,559	252,309	52	....	....	52	....	....
53	Foundries and machine shops	46	1,180	7	75	1,052	26	71	575,592	485,997	35	15	2	25	23	4
54	Furniture manufactories	21	†821	36	22	594	38	16	287,316	226,144	32	17	3	25	23	4
55	Furniture, retail	13	91	10	....	97	10	....	45,998	51,471	49	3	....	49	3	....
56	Furniture, wholesale	1	63	5	....	62	5	....	22,095	18,474	32	20	....	32	20	....
57	Furs, retail	2	9	22	....	5	13	....	8,700	7,000	39	13	....	40	12	....
58	Gas and electric lights	19	230	5	....	361	8	....	150,117	177,982	50	2	....	51	1	....
59	General merchandise stores	23	136	86	2	141	118	4	75,016	76,622	52		....	52	..	....
60	Glove manufactories	3	47	46	....	63	99	....	29,207	35,213	22	13	17	36	10	6
61	Glucose manufactory	1	350	....	....	350	....	....	6,216	127,702	....	6	46	52	...	....
62	Groceries, retail	8	57	6	....	83	7	2	83,214	88,822	52	....	...	52	...	....
63	Groceries, wholesale	48	524	48	1	847	66	....	714,050	747,884	52	....	....	52		....
64	Hardware manufactory	1	6	....	....	5	....	1	2,711	2,330	20	32	...	20	32	....
65	Hardware, retail	9	80	4	3	91	4	2	35,724	36,837	49	3	....	49	3	....
66	Hardware, wholesale	23	408	25	....	411	27	....	297,150	306,243	52	.	....	52	...	....
67	Harness and saddlery manufactories	12	148	11	7	185	9	3	54,948	51,830	37	13	2	29	20	3
68	Heating apparatus manufactory	1	18	....	....	24	....	....	7,473	7,166	50	2	....	40	....	12
69	Hides and tallow	3	33	1	....	31	1	....	16,002	14,604	48	....	4	48	....	4
70	Hotels and restaurants	'58	1,046	'300	....	1,064	1257	2	‡502,981	‡472,993	49	2	1	51	....	1
71	Iron bridge manufactory	1	25	....	3	15	....	....	12,000	5,500	52	....	....	39	13	....
72	Jeweler, retail	1	7	....	....	6	....	....	6,500	5,400	52	....	....	52	....	....
73	Jeweler, wholesale	1	12	....	....	18	2	....	10,600	10,600	52	....	....	52	....	....

74	Kindlingwood manufactory	1	23	3	.....	23	3	.....	3,000	2,148	13	36	3	13	32	7
75	Knitting works	1	13	42	.....	15	45	.....	14,513	15,853	48	4	...	45	4	3
76	Laundries	47	182	369	.....	200	438	.....	168,328	190,501	44	6	2	43	8	1
77	Lime manufactories	6	110	.....	.....	110	.....	.....	57.846	39,305	39	8	5	20	15	17
78	Linseed oil manufactories	7	128	.....	.....	118	.....	.....	40.481	38,034	28	9	15	26	21	6
79	Livery and transfer lines	19	268	2	.....	271	2	.....	121,456	122.042	50	1	1	50	1	1
80	Lumber and sawmills	8	1,110	.....	.....	1,287	1	.....	418.786	394,263	19	29	4	28	20	4
81	Lumber, retail	5	49	.....	.....	26	2	.....	22 259	19.014	48	4	.....	48	4	.....
82	Macaroni manufactory	1	17	30	.....	15	40	.....	8.417	10,684	26	26	......	26	26	.....
83	Marble and granite monuments	3	20	2	4	23	2	5	12 000	8.668	52		..	26	26	.....
84	Mattress manufactories	2	32	9	.....	32	9	.....	16,009	16 356	33	20	....	28	21	.....
85	Meat market	1	5	.....	.....	7	1	.....	2,100	3,500	52	....	......	52	....	.....
86	Medicine (patent) manufactories	6	225	56	.....	221	57	.....	119,451	117.775	51	1		52	.	.
87	Merchant tailors	26	272	47	3	234	31	7	140,897	123,452	39	12	1	38	13	1
88	Milling and grain	49	614	61	4	748	117	.....	347,464	386,289	37	11	4	40	10	2
89	Millinery, retail	3	6	32	3	8	49	4	10.421	13 680	52	......	..	52	....	.....
90	Millinery, wholesale	4	47	76	.....	48	74	.....	47,287	51.444	52	.....	....	52	.....	.....
91	Mineral water manufactories	5	31	1	2	24	1	.....	11,371	9,231	29	23	....	30	22	.....
92	Miners' tools manufactory	1	15	....	.....	12	.....	.....	9.360	7.800	52		. .	52	....	.....
93	Monument (bronze) manufactories	3	25	2	1	25	2	1	10.699	10.042	27	16	9	27	16	9
94	Newspapers, printers and binders	111	1,737	291	156	1,666	280	167	956.478	938,823	49	3	....	50	2	.....
95	Novelty iron and hardware manufactories	9	466	14	12	306	15	5	186.324	141.441	42	4	6	31	20	1
96	Nursery and seeds	1	15	10	.....	20	25	.....	13,000	8.000	10	42		13	26	13
97	Oatmeal manufactories	2	80	61	1	90	75	.....	53.000	62,500	50	2	.....	45	5	2
98	Office fixtures manufactory	1	5	.....	.....	5	....	.....	2.500	2,500	21	31	.	30	22	.....
99	Painters, paper hangers and decorators	13	199	4	15	181	5	6	72,719	63 147	26	22	4	29	20	3
100	Paint manufactory	1	13	2	.....	11	3	.....	4,730	8.463	40	12	....	30	22	......
101	Paper manufactory	1	25	8	.....	20	4	.....	7,000	8,440	40	12	....	45	5	.....
102	Paper, wholesale	2	24	.....	.....	24	.. .	.....	20,060	20,036	52	.....		52	..	.....
103	Peanut and coffee roaster manufactory	1	12	.....	.....	11	.....	.....	6.661	5,7 8	52	.....	.....	26	26	.....
104	Perfume and toilet articles manufactory	1	14	10	.....	20	15	.	17.197	10,500	52	......	....	52	...	.....
105	Planing mills	16	305	2	9	303	2	9	149.012	122,618	31	17	4	27	22	3
106	Plumbers and steam fitters	18	194	4	20	165	15	26	99.539	77,718	39	12	1	37	14	1
107	Pork packers	11	1,610	22	118	1,812	19	120	682,474	688.263	36	16	.....	35	10	7
108	Powder blasting	1	70	.....	.....	90	.....	.....	38,229	44.919	17	33	2	30	21	8
109	Pump (iron and wood) manufactories	8	185	7	13	124	7	2	98,752	86,774	43	4	5	23	26	3
110	Road grading machine manufactory	1	30	.....	.....	.....	.....	.....	4 800	....	35	17			....	52
111	Sash and door manufactories	34	3,929	17	5	3 936	14	8	1,299 627	1,217,495	33	16	3	32	18	2
112	Scale manufactories	2	17	1	4	16	1	4	7,800	5,450	52	.....	......	48	4	....
113	Seeds, retail	1	13	13	.....	10	9	.....	9,525	8,816	26	26		26	26	.....
114	Sewer pipe manufactory	1	60	.	.....	55	.....	.....	14.896	7,830	31	......	21	14	2	56
115	Sewing machine attachment manufactory	1	67	125	.....	67	125	.....	56,300	56.300	..	52	....	..	52	......
116	Sheet iron and tinware manufactories	4	60	....	2	62	.....	2	34.932	34,980	48	4	....	48	4	.....
117	Soap manufactories	6	66	21	.....	60	16	.....	33,734	30,338	45	7	....	43	8	1
118	Sorghum manufactories	5	83	2	.....	81	.....	.....	3,456	2,628	4	...	48	4	..	48
119	Spring manufactory	1	5	.....	.....	10	.....	.....	2,610	3,547	52	.....	..	52	.	....
120	Starch manufactories	4	150	65	.....	211	81	.....	73,722	109,480	43	2	7	49	3	.....
121	Stock yards	1	43	1	.....	42	.....	.....	26,708	29.308	52	...	...	52	......	.....
122	Stone quarries and cutters	10	820	1	1	874	.....	... .	176.236	210,798	28	18	6	36	9	7
123	Stoneware manufactories	2	25	.....	.....	27	.....	.....	7,011	8,978	28	18	6	36	16	.....

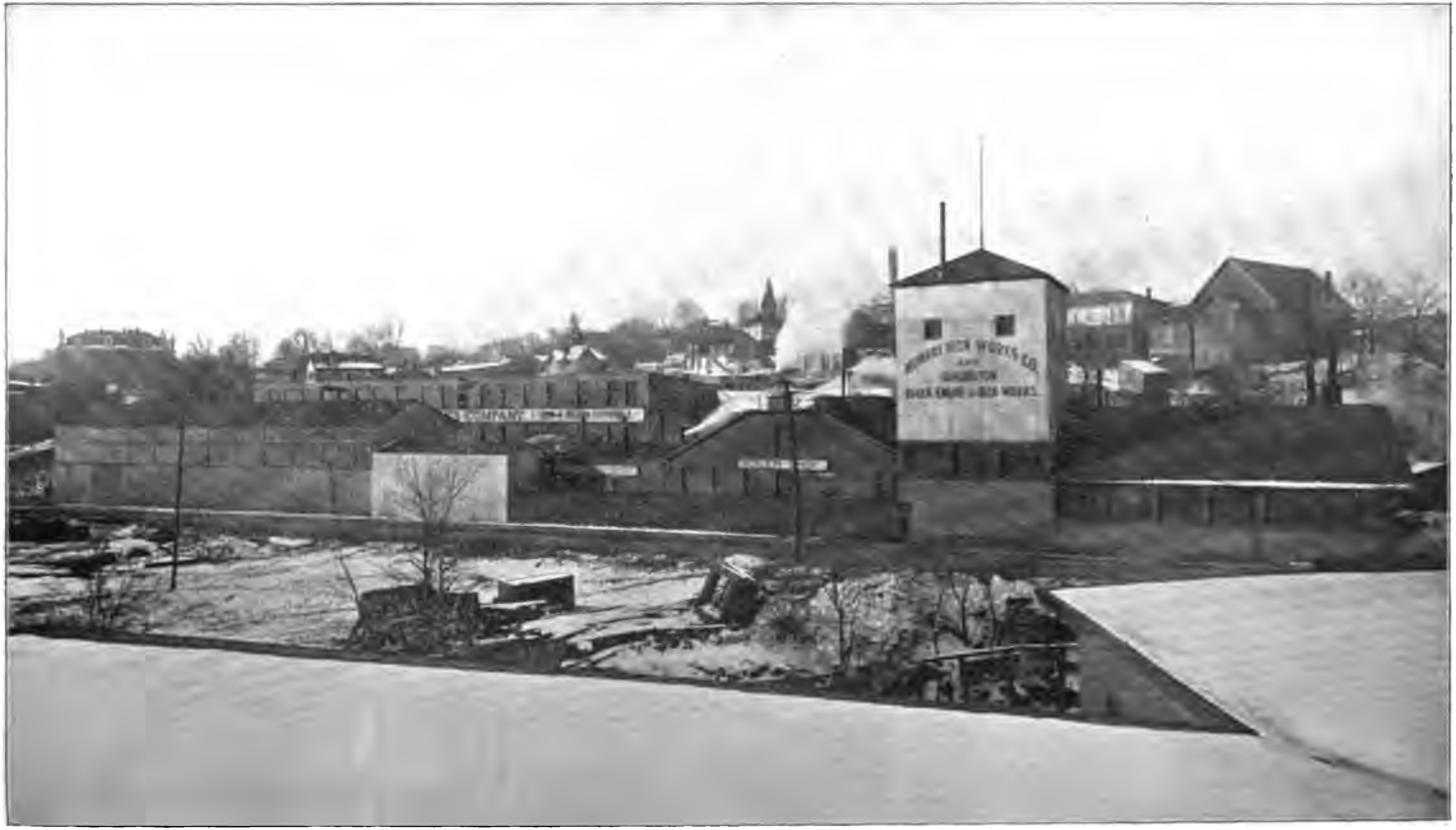
RECAPITULATION—CONTINUED.

Line No.	KIND OF BUSINESS.	No. reporting.	NO. EMPLOYED, 1895. Males.	NO. EMPLOYED, 1895. Females.	NO. EMPLOYED, 1895. Apprentices.	NO. EMPLOYED, 1896. Males.	NO. EMPLOYED, 1896. Females.	NO. EMPLOYED, 1896. Apprentices.	Amount of wages paid out in 1895.	Amount of wages paid out in 1896.	NO. WEEKS IN OPERATION, 1895 Full time, full force.	NO. WEEKS IN OPERATION, 1895 Short time, reduced force.	NO. WEEKS IN OPERATION, 1895 Suspended.	NO. WEEKS IN OPERATION, 1896. Full time, full force.	NO. WEEKS IN OPERATION, 1896. Short time, reduced force.	NO. WEEKS IN OPERATION, 1896. Suspended.
124	Stove and roofing manufactory	1	8	....	....	6	....	....	3,745	3,321	40	12	......	43	9	......
125	Street railways, electric	20	768	3	....	906	3	1	374,493	455,472	47	5	......	49	3	......
126	Stucco and cement manufactories	2	97	1	....	72	1	....	38,270	39,130	13	39	......	32	20	......
127	Suspender manufactories	3	23	25	....	21	28	....	13.591	18,410	41	9	2	40	11	1
128	Syrup manufactories	2	380	2	....	297	2	....	122,080	87,300	39	13	......	34	18	......
129	Tannery	1	10	5	....	7	3	....	6 000	5,000	52	....	......	52	......	......
130	Telephone operators	15	77	121	....	82	150	....	85,721	106,929	50	2	......	52	......	......
131	Tent and awning manufactory	1	14	11	....	17	11	....	4,258	4,040	52	......	......	30	22	....
132	Trunk manufactory	1	5	1	1	4	1	1	2,400	2.400	52	......	......	48	4	......
133	Typewriter manufactory	1	98	3	....	85	2	....	35.582	57,688	39	13	......	20	32	......
134	Vinegar and pickle manufactories	9	140	55	....	106	75	....	85.427	78 447	36	16	......	41	11	......
135	Wall paper and oils, retail	6	41	5	....	46	4	....	18,343	21,855	52	...	......	52	....	......
136	Water tank manufactory	1	14	....	....	15	....	....	2,100	2,895	25	25	2	20	12	......
137	Water works	11	114	....	....	125	....	....	89,721	79,740	49	3	......	43	7	2
138	Wholesale butter and eggs	13	225	33	....	266	65	....	111.469	116,996	38	13	1	38	18	1
139	Wholesale coal	1	14	2	....	14	2	....	7,000	7.000	52	....	......	52	...	......
140	Wholesale fruits	21	208	30	....	220	46	....	129,318	128,274	51	1	......	50	2	......
141	Wholesale leather	2	60	1	7	51	7	5	22,000	24.644	48	9	......	49	3	......
142	Wholesale liquors	6	47	....	....	47	....	....	30,780	30,780	52	......	......	52	......	......
143	Wholesale meats	2	12	....	....	13	....	....	9,250	9,500	52	......	......	52	......	......
144	Wholesale oils	4	57	3	....	55	8	....	47,685	47,844	52	......	......	52	......	......
145	Wholesale rubber goods	1	6	1	....	7	1	....	6.471	6,225	52	......	......	52	......	......
146	Wholesale salt and cement	2	72	1	....	62	1	....	30,364	28,595	52	......	......	52	......	......
147	Wholesale spice and coffee	4	52	14	....	60	12	....	52,404	65.634	52	......	......	52	......	......
148	Wholesale toys	1	10	2	....	10	2	....	7,050	6,125	52	....	......	52	....	......
149	Windmill manufactories	2	35	1	3	28	1	1	11,575	7,546	47	5	......	34	15	3
150	Wire works and wire fence manufactories	4	30	1	....	19	....	....	9.435	5,964	27	25	......	26	26	......
151	Woodenware manufactories	2	77	1	15	81	16	....	25,921	22.042	33	10	9	27	20	5
152	Woolen mills	8	118	95	....	92	78	....	57,608	42,683	35	8	14	33	3	16
	Grand total	1752	42478	7436	730	40854	7732	687	$ 18,119,080	$ 17,369,622						
	Grand average	....	......	......	......	......	......	......	....	....	43	5	5	40	8	4

*1895—Of which 146 are convicts. 1896—Of which 136 are convicts.

†Of which 120 are convicts.

‡The amount is exclusive of board and room which the employes of hotels and restaurants receive.



MURRAY IRON WORKS, BURLINGTON.

STRIKES.

COUNTIES.	1895.							1896.						
	Number of.	Number of persons involved.	Days continued.	Loss of wages.	Property destroyed.	Value of.	CAUSE OF STRIKE.	Number of.	Number of persons involved.	Days continued.	Loss of wages.	Property destroyed.	Value of.	CAUSE OF STRIKE.
Appanoose	25	1,089	47	$ 56,515	.....	.....	Reduction in wages.	7	254	15	$ 6,800	.....	.....	Reduction in wages.
Boone	7	673	71	52,300	.....	.....	Reduction in wages	...	.....	.....	.....	.....	.....	.....
Jasper	1	265	3	2,500	.....	.....	.....	1	275	50	25 000	.....	.....	Reduction in wages.
Keokuk	2	34	16	700	.....	.....	Reduction in wages.	3	285	141	40,575	.....	.....	Reduction in wages.
Lucas	...	.....	...	.....	.....	.....	.....	1	25	10	150	.....	.....	Reduction in wages.
Marion	1	80	2	500	.....	.....	Reduction in wages.	...	.....	.....	.....	.....	.....	.....
Mahaska	1	12	1	20	.....	.....	Reduction in wages.	...	.....	.....	.....	.....	.....	.....
Polk	2	91	20	2,650	.....	.....	Reduction in wages.	1	50	3	2,000	.....	.....	Reduction in wages.
Wayne	1	90	45	3,500	.....	.....	Reduction in wages.	...	.....	.....	.....	.....	.....	.....
Grand total	40	2 484	26	$ 118,715	.....	.....	.....	13	889	219	$ 74,025	.....	.....	.....

RAILROAD STATISTICS.

The law regulating the bureau of labor requires that the information given in the biennial report shall be compiled by counties. In the case of railroad employes this could not be done as the roads do not keep accounts by counties, therefore the facts contained herein are from the railroad commissioners' reports for 1895 and 1896:

RAILROAD EMPLOYES AND SALARIES, 1895.

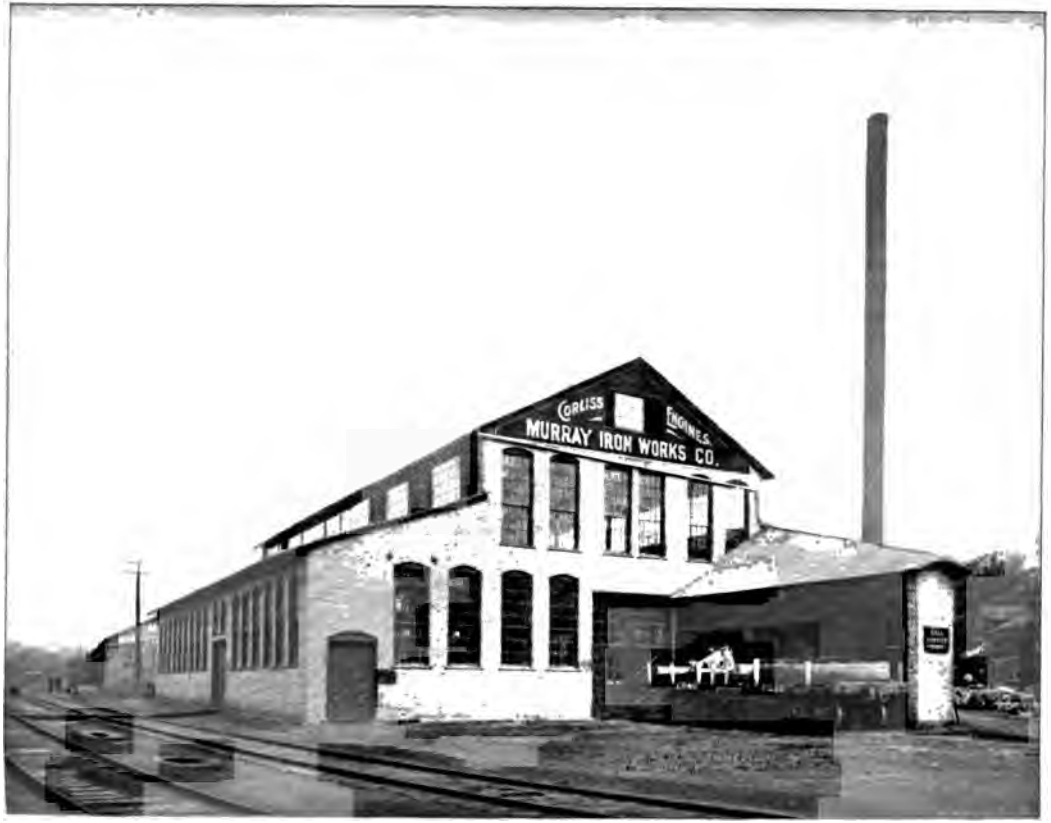
RAILROADS.	GENERAL OFFICERS.			GEN. OFFICE CLERKS.			STATION AGENTS.			OTHER STATION MEN.			ENGINE MEN.		
	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compention.	Av. daily compensation.
Ames & College	....	....	....	....	....	....	....	....	....	....	....	....	1	$ 600.00	$ 1.64
Albia & Centerville	1	$ 765.00	$ 2.44	....	....	....	2	$ 1,108.90	$1.77	1	$ 60.00	....	....	....	....
Boone Valley	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....
Burl., Cedar Rapids & Northern	20	50,877.88	8.12	90	$ 61,081.86	$2.16	151	88,929.50	1.85	1.48	68,338.50	$1.45	99	112,968.00	3.60
Chicago, Burlington & Quincy	9	21,624.96	6.58	27	26,076.50	3.09	118	75,096.75	1.74	3.23	123,636.10	1.22	164	170,272.80	2.84
Chicago, Burl & Kansas City	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Kansas City, St. Jo. & C. Bluffs	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
St L., Keokuk & Northwestern	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Chicago, Ft. Madison & Des Moines	3	3,600.00	3.29	3	2,115 00	....	10	5,116.45	1.40	3	1,320.99	1.20	2	2.317 67	3.46
Chicago, Iowa & Dakota	2	2,300.00	4.75	1	445.00	1.33	6	2.482.50	1.82	....	....	....	2	1,488.00	2.98
Chicago Great Western	....	....	....	....	....	....	74	42.628 47	1 58	92	44,821.98	1.33	54	72,940.50	3.70
Chicago, Milwaukee & St. Paul	6	45,922 70	19.36	*a* 94	97,420.43	1.76	224	119,757.82	1.71	233	120.462 08	1.65	198	230,528.85	3.71
Chicago, Rock Island & Pacific	....	....	....	....	....	....	170	101,683.08	1.92	184	98,333 40	1.71	151	197.472 60	4.19
Chicago & North-Western	2	6,600.00	10.54	10	15,490.00	4.96	168	106,835 17	2.03	246	126,777 21	1.65	266	301.826.25	3.62
Chicago, St. P., Minneapolis & O.	....	....	....	....	....	....	12	9,000.00	2.40	31	18,051.90	1.87	11	12,069 34	3.52
Sioux City & Pacific	....	....	....	....	....	....	13	10,368.39	2.55	86	21.179 86	1.88	12	16,351 04	4.35
Chicago, Santa Fe & California	1	2,700.00	7.50	9	9,708.00	....	4	2,342.64	2.17	13	6,720 00	1.56	49	63,963 00	4.82
Crooked Creek	1	1.200 00	3.88	1	800 00	2.56	....	....	....	1	27.50	1.00	1	876.75	2.40
Des Moines Northern & Western	6	7.399 92	3 72	10	6,133.74	1.77	23	11,739.61	1.29	....	....	....	8	9,263.50	3.35
Dubuque & Sioux City	12	28,626 03	7.62	88	56,014.86	2.03	93	56,646.87	1.62	143	75,353.90	1.25	72	85,859 22	3.58
Des Moines Union	2	2 800 00	3.84	1	600 00	1.64	....	....	....	40	19,926.42	1.39	3	2,675 16	2.46
Humeston & Shenadoah	3	7,299 84	7.77	5	4,756 35	....	14	8,033 65	1.88	1	177.00	.57	4	4,626.12	3.78
Iowa Central	10	25,866.66	8.26	47	30,466.87	3.07	69	28,246.17	1.29	37	21,187.67	1.82	33	45,664.13	3.76
Iowa Northern	1	600.00	1.67	....	....	....	....	....	....	....	....	....	1	960.00	2.67
Keokuk & Western	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Mason City & Ft. Dodge	4	6,129 96	4.29	3	2,000.00	1.83	12	6,470 00	1.48	....	....	....	8	8,501.30	2.99
Minneapolis & St. Louis *b*	....	6,012 01	....	....	4,055 60	....	....	2,985.00	....	....	470 00	....	11	4,396 00	....
c	5	12,539.00	12.23	15	8,111 23	2 45	14	5,870.00	2 02	3	1,040 00	1.66	....	8,792 00	3.57
Miss River R. R. & T. Bridge Co.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Omaha & St Louis	2	7,498.00	10.42	6	4,160.70	2.72	10	8,517.43	1.88	8	3,593.52	1.26	8	6,333.74	4.50
Prairie du Chien & McGregor	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Sioux City & Northern	11	11,032 20	4.15	12	6,694 60	2.02	13	7,064.80	1.55	13	6,185.30	1.45	5	5,953 80	3.52
Tabor & Northern	6	....	....	....	....	....	1	420.00	1.34	....	....	....	1	709 20	2.97
Union Pacific	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wabash	1	3,271.69	12.71	6	4,983.75	2.70	9	5,240.05	1.80	19	9,848.84	1.63	11	12,646.56	3.89
Winona & Southwestern	4	1,099 78	3.57	2	207.00	1 88	3	2,043.00	1.85	....	....	....	4	1,156.85	2.43
NARROW GUAGE ROADS.															
Burlington & Northwestern	2	1,200.00	3.84	7	1,870.75	1.71	8	3,097.50	1.24	3	496 25	.53	2	1 580 40	2 52
Burlington & Western	2	1,800 00	5.73	7	2,349.10	2.14	14	5,182.46	1.18	2	722.51	1.15	3	3,738 70	3 98
Des Moines & Kansas City	2	1,710 00	5.46	3	1,769.87	1.95	17	4,873 50	.91	12	928.10	.24	4	3,933.00	2.65
Total	118	$ 260.475 62	....	447	$ 347,310.21	....	1,252	$ 721,748 21	....	1,592	$ 769,659.15	....	1,184	$1,385,464.46	....

a Includes 14 "other officers" at $9.25 per day. *b* July 1 to October 31, 1894. *c* November 1 to June 30. 1895.

RAILROAD EMPLOYES AND SALARIES, 1895—CONTINUED.

RAILROADS.	FIREMEN.			CONDUCTORS.			OTHER TRAINMEN.			MACHINISTS			CARPENTERS.		
	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.
Ames & College	....	....	......	1	$ 540 00	$1.47	......	....	......	......	....	......	......	....	......
Albia & Centerville.	......	....	......	......	....	......	......	....	......	......	....	......	1	$ 735.36	$2.35
Boone Valley	1	....	......	1	....	......	1	....	......	......	....	......	......	....	......
Burl., Cedar Rapids & Northern	106	$ 69,036 00	$2.20	74	66,433 20	2 90	144	$ 85,566 00	$1.95	86	$ 48,465.00	$2.25	164	91,726.30	1.90
Chicago, Burlington & Quincy	174	99,576 40	1 56	134	118,584 15	2.43	224	113,768 65	1.39	248	119,964.00	1.54	188	105,744.15	1.80
Chicago Burl. & Kansas City.	......	....	......	......	....	......	......	....	......	......	....	......	......	....	......
Kansas City, Burl. & C. B.	......	....	......	......	....	......	......	....	......	......	....	......	......	....	......
St Louis, Keokuk & N. W.	......	....	......	......	....	......	......	....	......	......	....	......	......	....	......
Chicago, Ft. Madison & D. M.	2	1,555.71	2.30	2	1,801.15	2 71	3	1,962 23	1.92	1	776.20	2.32	1	525.67	1.52
Chicago, Iowa & Dakota	1	420.00	1.84	1	648.00	2.07	2	889.73	1.42		....	......	......	....	......
Chicago Great Western	108	84,277.80	2 14	84	87,978 00	2 87	195	98,928.00	1.39	76	62,815.00	2.27	127	79,936.20	1.73
Chicago, Milwaukee & St. Paul.	201	142,859.23	2.28	152	155,777.96	3.29	324	189,912 55	1.87	124	103,057 87	2.65	139	95,800 01	2.21
Chicago, Rock Island & Pacific.	144	118,291.92	2.63	109	122,142 72	3.59	190	136,742 28	2.31	60	44 325 60	1 99	88	59,879 64	2 23
Chicago & North-Western	296	203,214 40	2.19	195	197,818.77	3.24	409	252,872 27	1.97	152	91,432.29	1 96	166	104,122 83	2.00
Chicago, St. Paul, Minn. & O.	11	7,466 26	2.18	7	8,144.07	3.73	19	11,860 47	2 00	45	29,052 24	2.07	38	23,041.62	1.94
Sioux City & Pacific	18	10,459 14	2.57	8	8,972 07	3.58	17	10,320 28	1.94	37	25,827.43	2.23	61	37,701.03	1.97
Chicago, Santa Fe & California.	47	33,255 28	2 57	40	45,526 80	3.41	104	64,270.20	1.99	92	49,680.00	2.09	30	16,119.00	2.15
Crooked Creek	1	540 00	1.73	1	600.00	1.92	......	....	......	......	....	......	......	....	......
D. M. Northern & Western	8	5,622.08	2.03	6	6,036.74	2.78	9	5,288 01	1.67	......	....	......	......	....	......
Dubuque & Sioux City	71	49,517 79	1 90	47	51,921.84	3.31	95	68,598 33	2 09	73	39,740 85	2.48	61	25,549 60	1.90
Des Moines Union	3	1,734.40	1.60	......	....	......	......	....	......	7	4,111.68	2.53	3	1,306.04	2.12
Humeston & Shenandoah	4	2,713.01	2.21	3	2,897.19	3.18	6	3,323 96	1.85	4	3,190 28	2 45	13	3,579 58	2.06
Iowa Central	38	25,834 81	2.13	30	30,286 59	3.12	56	38,851 12	1.85	26	14,943.40	2.04	41	22,814 27	1.99
Iowa Northern	1	540.00	1.50	1	600.00	1 66	2	960.00	1.33	......	....	......	......	....	......
Keokuk & Western	......	....	......	......	....	......	......	....	......	......	....	......	......	....	......
Mason City & Ft. Dodge	3	2,231 66	1.91	3	2,557 74	2.58	5	2,153.77	1.74	3	1,965.04	2.50	9	3,564 59	1.94
Minneapolis & St. Louis. a	......	2,659 00	......	....	2 500.00		......	3,080.00	......	......	280.80		......	1,302 00	......
b	11	5,318.00	2.16	7	5,000.00	3.22	14	6,160.00	1 99	1	561.60	2.70	5	2,604.00	2.50
Miss River R. R. & T. B. Co.	......	....	......	......	....	......	......	....	......	......	....	......	......	....	......
Omaha & St Louis	8	3,502.74	2 50	4	3,279 25	3.60	9	4,599.64	2.40	1	1,040.52	2.60	1	287.50	2.00
Prairie du Chien & McGregor	......	....	......	......	....	......	......	....	......	......	....	......	......	....	......
Sioux City & Northern	5	3,534 30	2.09	4	3,544 65	3.09	8	4,110.40	1.87	4	2,919.65	2.84	5	2,818.40	2.21
Tabor & Northern	1	462.09	1.48	1	435 81	1.39	......	....	......	......	....	......	......	....	......
Union Pacific	......	....	......	......	....	......	......	....	......	......	....	......	......	....	......
Wabash	11	7,412 50	2.25	7	7,360.21	3.49	14	9,342 67	2.21	10	6,230 49	1.94	7	5,142.32	2.24
Winona & Southwestern	4	700 81	2.57	3	852 82	4.15	2	889 88	2.25	1	735.02	2 25	4	2,151.15	2.15
NARROW GAUGE ROADS.															
Burlington & Northwestern	3	1,192.50	1.91	1	607.45	1.94	2	738 25	1.18	3	2,620 40	2 70	3	1,755.40	1.87
Burlington & Western	3	2,988 90	3.18	3	2,801.36	3.06	6	2,617 54	1 97	..	....		3	1,243 68	1.98
Des Moines & Kansas City	4	2,280 00	1 54	4	2,870 00	1.00	6	1,050 00	[illegible]	5	2,418.96	1.92	3	1,549 51	1.80
Total	1,577	$889,106.25		933	$938,137.04	.....	1,868	$1,119,898 70		1,059	$658,148 [illegible]	..	1,165	$695,494.[illegible]	.....

a July 1, to October 31, 1894. b November 1, 1894, to June 30, 1895.



MURRAY IRON WORKS, BURLINGTON.

RAILROAD EMPLOYES AND SALARIES, 1895—CONTINUED.

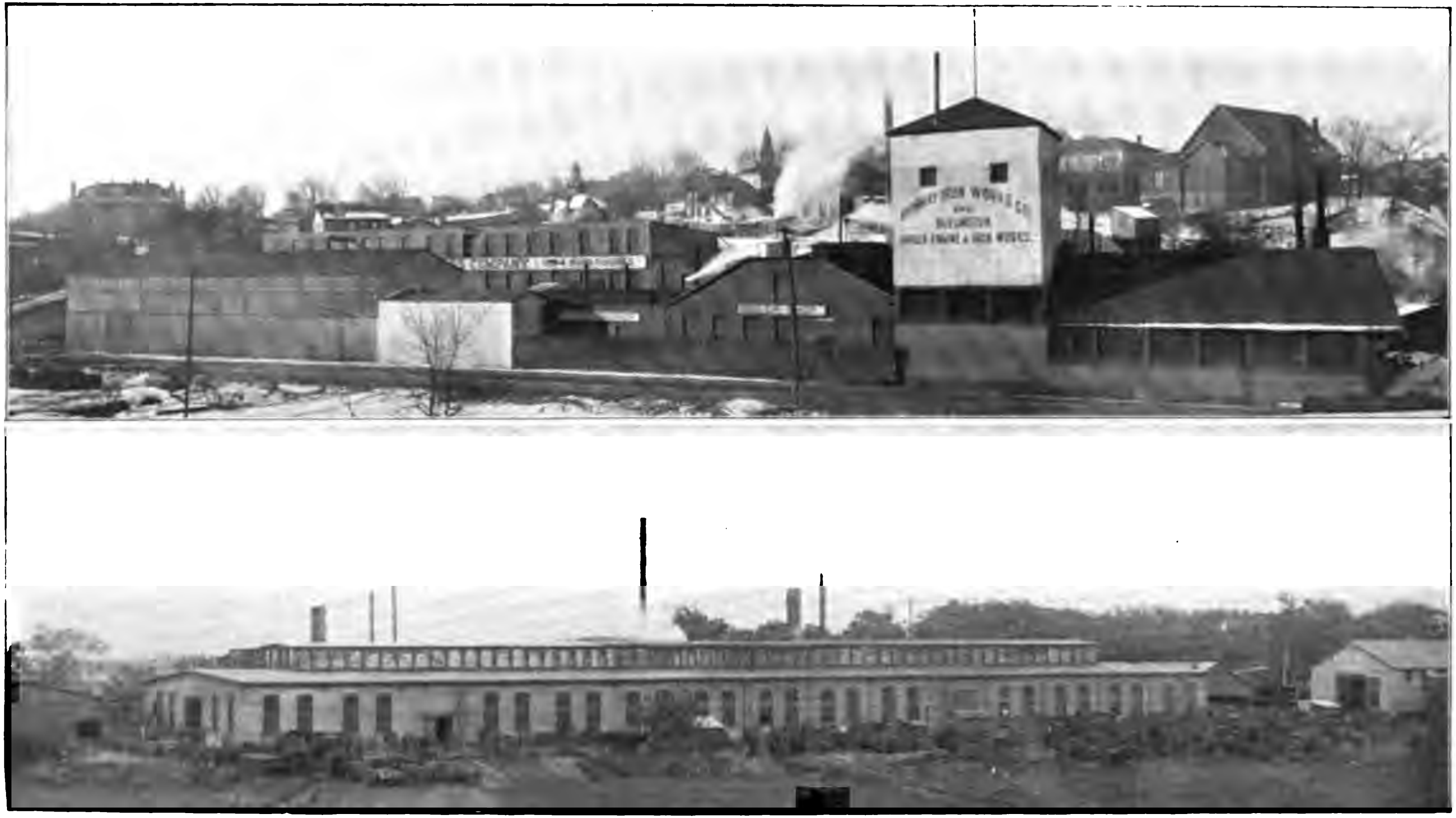
RAILROADS.	OTHER SHOP MEN.			SECTION FOREMEN.			OTHER TRACK MEN.			SWITCHMEN, FLAGMEN AND WATCHMEN.			TELEGRAPH OPERATORS & DISPATCHERS.		
	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.
Ames & College	....	....	....	1	$ 360.00	$ .98	....	....	....	....	....	....	....	....	....
Albia & Centerville	....	....	....	4	1,721 30	1.37	18	$ 6,169.10	$1.09	....	....	....	1	$ 330.00	$ 1.05
Boone Valley	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Burlington, Cedar Rap & N.	335	$ 158,893 84	$1.59	183	87,064.08	1 52	544	212,840 08	1.25	64	$ 45,456.75	$2.25	98	53,216 16	1.98
Chicago, Burlington & Quincy	705	340,880.20	1.54	174	89,340 00	1.41	518	178 044.40	1.11	155	105,797.10	1.37	95	61,212.91	1.77
Chicago, Burlington & K. C.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Kansas City, St. Jo. & C. B.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
St. Louis, Keokuk & N. W.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Chicago, Ft. Madison & D. M.	4	1,922 37	1.70	8	4,399 50	1 50	19	7,338 51	1.25	....	....	....	....	....	....
Chicago, Iowa & Dakota	....	....	....	4	1,710 00	1.37	9	2,988.87	1.10	....	....	....	....	....	....
Chicago Great Western	106	89,787 85	2.32	77	44,133 45	1.57	244	112,637.10	1.26	32	26,723 77	2.29	37	25,229.16	1.87
Chicago, Milwaukee & St. P.	507	266,468.82	1 68	236	137,255 47	1 86	702	267,127 81	1.33	234	150,247.20	2 05	172	162,877.97	2 06
Chicago, Rock Island & Pac.	255	167,159 16	1.65	188	103,160 00	1 76	951	365,061.12	1.28	109	79 272.00	2 33	98	75,298.33	2 46
Chicago & North-Western	557	269,843 07	1.55	213	116,510.00	1 75	645	257,474 73	1.27	154	107,220 57	2.22	95	66,295.01	2.23
Chicago, St. Paul, M. & O.	7	7,719 96	3.53	14	7,800.00	1.79	22	8,762 93	1.28	14	11,003.73	2.52	8	4,946 97	1.98
Sioux City & Pacific	148	76,596 63	1.65	14	7,18[illegible] 68	1.64	36	15,067.85	1.84	22	13 820 55	2 01	6	3,061 94	1 63
Chicago, Santa Fe & Cal.	224	115,957 20	1 76	5	2,760 00	1 53	58	12,227 04	1.31	17	12,213.36	2.57	6	3,360 00	1.87
Crooked Creek	1	480.00	1.32	2	1,020 00	1.63	4	1,019 83	1 25	....	....		....	....	....
Des Moines Northern & W.	....	....	....	24	12,453 27	1 43	70	23 418 58	1.23	....	....		7	3,530.77	1 68
Dubuque & Sioux City	135	78,087.95	1.80	98	48,623.23	1.61	478	10[illegible],071.14	1.07	9	4,023 85	1 20	47	29,774 03	2.92
Des Moines Union	32	10,[illegible]67 62	1 27	1	720 00	1 98	12	4,117 40	1 25	26	13,258.57	1.71	....	....	....
Humeston & Shenandoah	12	6 671.82	1 80	18	9,718 27	1 72	28	9,768 33	1 10	..	....	..	2	1,996.15	3.19
Iowa Central	99	62,587 53	2.00	81	39,109 96	1.55	177	42,216 01	1 27	19	13,181.67	2.18	32	16,850 99	1.44
Iowa Northern	....	....	....	1	540.00	1.50	5	2,347.50	1.50	....	....	...	...	....	....
Keokuk & Western	....	....	....	....	....	....	....	....		....	....	....	....	....	....
Mason City & Ft. Dodge	13	5,505 68	1.31	15	8,130.00	1.48	64	10 896 89	1.15	....	....	....	2	960.00	1.31
Minneapolis & St. Louis *a*	..	1,289.60	...	...	4,860 00	....	....	6,292 00	...	....	1,100 00	..	...	1,505 00	....
Minneapolis & St. Louis *b*	9	2,379 20	1.38	27	9,720 00	1.73	55	12,584 00	1.10	5	2,360.00	1.95	8	3,010.00	1 81
Miss. River R. R. & T. B. Co.	....	....	....	..	....	....	....	....	....	...	....	....	...	....	....
Omaha & St. Louis	10	5,168.92	1 81	12	5,547.60	1.54	23	8,197.20	1.10	4	2,712 48	2.02	3	2,329.50	2 31
Prairie du Chien & McGregor	...	....	....	....	....		....	....	....	...	....	...	...	....	....
Sioux City & Northern	21	13,422 55	2.12	13	6,000 35	1 64	37	3,310.95	1.24	6	2,957 65	1.39	5	1,687.50	1 64
Tabor & Northern	....	....	....	1	452 50	1.44	4	868.48	1 10	1	56.67	.87	1	....	....
Union Pacific	...	....	...	....	....		....	....	....	..	....	....	...	....	....
Wabash	29	15,567 25	1 72	8	4,614 38	1.80	31	11,247 56	1.16	14	9,225.69	2.11	7	4,414 03	1 99
Winona & Southwestern Winona & Western	3	1,853 83	1.78	3	1,635.00	1.50	9	3,101.19	1.25	....	....	....	1	90.00	2.00
NARROW GAUGE ROADS															
Burlington & Northwestern	13	6,195.25	1.52	7	4,099 60	2.02	17	6,254.45	1.17	1	560 60	1.50	1	480.00	3.08
Burlington & Western	...	....		12	6,084 05	1 62	23	8,049 76	1.17	1	480.00	1.50	1	480 00	3 00
Des Moines & Kansas City	6	1,608 96	1.04	17	8,208.00	1.31	23	9,803 92	1.10	3	1,304.10	1.88	1	637 00	1.91
Total	3,231	$1,670,914.76	....	1,461	$774,973 69	....	4,806	$1,715,334.65	....	890	$603,055 21	....	734	$523,588 42	....

a July 1 to October 31, 1894. *b* November, 1894, to June 30, 1895.

RAILROAD EMPLOYES AND SALARIES—1895—CONTINUED.

RAILROADS.	ALL OTHER EMPLOYES AND LABORERS.			TOTAL, INCLUDING GENERAL OFFICERS.			TOTAL, EXCLUDING GEN'L OFFICERS.			DISTRIBUTION OF SAME.			
	Number	Total yearly compensation.	Av. daily comp'n-sation.	Number	Total yearly compensation.	Av daily comp'n-sation.	Number	Total yearly compensation.	Av. daily comp'n-sation.	General adminis-tration.	Mainte-nance of way and struc'r's	Mainte-nance of equip-ment.	Con-ducting trans-portat'n.
Ames & College	1	$ 240.00	$ .65	4	$ 1,740.00	$1.18	4	$ 1,740.00	$1.18	....	....	....	$ 1,740.00
Albia & Centerville	1	356.15	1.14	29	11,245.81	1.24	28	10,480.81	1.20	....	$ 9,390.76	....	1,855.05
Boone Valley	.....	....	.....	.....	3,900.00	...	.....	3,900.00	...	....	....	....	3,900.00
Burl., Cedar Rapids & N.	70	46,230.10	2.11	2,376	1,312,132.67	1.86	2,356	1,291,254.79	1.80	$111,959.24	339,293.52	$ 251,476.13	639,403.78
Chicago, Burl. & Quincy	150	67,377.35	1.44	3,401	1,816,496.42	1.62	3,392	1,794,871.46	1.59	47,701.46	395,587.66	482,803.32	890,403.98
Chicago, Burl. & K. C.	.....	....	.....	*106	65,103.64	.....	106	65,103.64	.....	....	....	....	....
Kansas City, St. Joe & C. B.	.....	....	.....	*102	42,472.20	.....	102	42,472.20	.....	....	....	....	....
St. L., Keokuk & N. W.	.....	....	.....	*48	22,014.96	.....	48	22,014.96	.....	....	....	....	....
Chicago, Ft. Madison & D. M.	.....	....	.....	61	34,791.45	1.69	58	31,191.45	1.60	5,735.00	11,738.01	3,224.24	14,094.20
Chicago, Iowa & Dakota	.....	....	.....	28	13,371.93	.....	26	11,071.93	.....	....	....	....	....
Chicago Great Western	116	69,617.96	1.64	1,128	737,970.34	1.79	1,128	737,970.34	1.79	....	178,839.44	176,291.63	382,839.26
Chicago, Milwaukee & St Paul	848	459,409.81	1.73	4,394	2,744,906.08	1.99	4,388	2,698,983.38	1.96	143,343.13	631,328.40	801,939.67	1,668,291.88
Chicago, Rock Island & Pacific	109	90,102.72	2.65	2,806	1,728,904.56	1.96	2,806	1,728,904.56	1.96	....	49[illegible],245.86	271,3[illegible]8.64	959,270.56
Chicago & North-Western	198	108,661.41	1.75	3,772	2,335,064.00	1.98	3,770	2,328,464.00	1.98	12,540.00	519,832.43	237,071.6[illegible]	1,565,619.90
Chicago, St. P., Minn. & O.	35	20,056.67	1.84	274	178,976.16	2.09	274	178,976.16	2.09	....	....	....	....
Sioux City & Pacific	6	4,133.[illegible]8	2.2[illegible]	429	261,043.67	1.94	429	261,043.67	1.94	....	29,8[illegible]8.07	86,595.96	144,619.64
Chicago, Santa Fe & California	50	23,745.84	1.72	744	461,548.72	2.21	743	461,848.72	2.20	17,028.72	32,012.16	183,866.20	231,651.64
Crooked Creek	.....	....	.....	13	6,564.06	1.61	12	5,364.06	1.71	1,200.00	2,039.83	....	3,324.23
Des Moines Northern & West'n.	8	5,136.83	1.78	179	96,012.05	1.63	173	88,642.13	1.56	13,533.66	37,672.05	1,083.48	43,753.06
Dubuque & Sioux City	222	102,305.41	1.52	1,734	901,714.40	1.79	1,722	873,088.37	1.75	84,640.8[illegible]	20[illegible],0[illegible]6.28	177,358.20	438,649.03
Des Moines Union	19	11,480.94	2.01	149	72,808.23	1.62	147	70,098.23	1.59	3,400.00	6,537.53	7,487.71	55,472.99
Humeston & Shenandoah	3	1,638.12	1.74	120	75,3[illegible]8.69	2.01	117	68,088.85	1.86	8,576.19	26,750.66	11,813.54	28,248.80
Iowa Central	44	29,587.29	2.14	834	487,785.14	1.98	824	461,918.48	1.90	56,33[illegible].53	121,198.01	85,169.91	225,083.69
Iowa Northern	.....	....	.....	12	6,547.50	1.60	11	5,947.50	1.59	600.00	2,887.50	....	3,060.00
Keokuk & Western	.....	....	.....	*173	92,324.42	.....	171	87,377.42	..	....	....	....	....
Mason City & Ft. Dodge	1	1,500.00	4.11	140	57,566.63	1.68	136	51,434.67	1.57	8,129.96	21,407.61	10,154.59	17,874.47
Minneapolis & St. Louis a	.....	1,72[illegible].00	.....	.....	44,537.00	.....	.....	38,525.77	.....	10,067.60	12,872.00	2,872.40	18,725.00
Minneapolis & St. Louis b	10	3,440.00	1.65	199	89,689.03	2.18	194	77,150.03	1.87	20,650.23	25,744.00	5,744.80	37,550.00
Miss River R. R. & T. B. Co	.....	....	.....	.....	....	.....	.....	....	.....	....	....	....	....
Omaha & St Louis	18	10,881.35	1.87	127	77,650.09	2.06	125	70,152.09	1.89	11,658.70	24,626.15	6,496.91	34,868.30
Prairie du Chien & McGregor	.....	....	.....	.....	....	.....	.....	....	.....	....	....	....	....
Sioux City & Northern	21	8,545.90	1.64	183	94,277.50	1.94	179	89,957.30	1.89	17,726.80	16,621.70	16,842.20	43,583.80
Tabor & Northern	.....	....	.....	16	....	.....	10	....	.....	....	....	....	....
Union Pacific	.....	....	.....	.....	....	.....	.....	....	.....	....	....	....	....
Wabash	15	11,075.92	2.87	199	127,623.91	2.06	198	124,352.22	.....	8,272.18	22,573.26	22,748.39	74,030.08
Winona & Southwestern Winona & Western	2	251.50	1.55	42	16,251.28	1.94	38	15,151.50	1.87	1,435.58	7,481.85	2,188.54	5,145.81
NARROW GAUGE ROADS.													
Burlington & Northwestern	.....	....	.....	72	32,746.80	1.57	70	31,546.80	1.54	3,070.75	10,834.05	10,571.05	8,270.95
Burlington & Western	.....	....	.....	78	39,628.06	1.78	76	37,828.06	1.67	4,149.10	15,377.49	....	20,101.47
Des Moines & Kansas City	18	451.44	1.05	135	44,885.96	1.26	133	43,175.96	.....	3,479.88	15,148.20	7,272.59	18,985.79
Total	1,965	$1,077,946.49	.....	24,107	$14,168,808.85	.....	23,994	$13,910,093.50	.....	$ 595,232.10	$3,216,926.08	$2,561,961.80	$7,680,419.86

a July 1st to October 31, 1894. b November 1, 1894, to June 30, 1895. * From report of 1894.



MURRAY IRON WORKS, BURLINGTON.

RAILROAD EMPLOYES AND SALARIES, 1896.

RAILROADS.	GENERAL OFFICERS.			GEN. OFFICE CLERKS.			STATION AGENTS			OTHER STATION MEN.			ENGINE MEN.		
	Number.	Tot'l yearly compensation.	Av. daily compensation	Number.	Tot'l yearly compensation.	Av. daily compensation.	Number.	Tot'l yearly compensation.	Av. daily compensation.	Number.	Tot'l yearly compensation.	Av. daily compensation.	Number.	Tot'l yearly compensation.	Av. daily compensation.
Ames & College	....	....	.....	.....	....	.....	.....	....	.....	.....	....	.....	1	$ 624 60	$1.71
Albia & Centerville	....	....	.....	.....	....	.....	2	$ 1 207 80	$1 92	1	$ 60.00	$ .19	.....	....	.....
Atchison, Topeka & Santa Fe	*4	$ 6,300.00	$4.37	.....	....	.....	3	2,344.56	2.17	18	6,522.24	1.49	49	60,877.44	4.64
Boone Valley	....	....	.....	.....	....	.....	.....	....	.....	.....	....	.....	2	....	.....
Burl., Cedar Rapids & Northern	22	56,672 43	8.23	97	$ 56,673.81	$1.87	164	99,777.60	1.95	190	76,789 35	1.35	116	142,975 00	3 80
Chicago, Burlington & Quincy	14	23,291.60	6.49	29	25,976.00	3.04	126	69,409 80	1.64	295	107,851 96	1.17	150	161,307.35	3.01
Chicago, Burl. & Kansas City	....	....	.....	.....	....	.....	13	6 899 10	1 45	2	636.84	.87	10	12,787.80	3.49
Kansas City, St. Jo. & C. Bluffs	....	....	.....	.....	....	.....	9	5,500.98	1.67	1	560 70	1.45	2	2,309.94	3.69
St. L., Keokuk & Northwestern	....	....	.....	.....	....	.....	7	3,806 95	1.49	13	7,022 60	1.48	.....	....	.....
Chicago, Ft. Madison & Des Moines	3	3,990 00	3.64	‖4	2,321.50	1.07	10	5,170.00	1 42	3	1,569.30	1.45	2	2,325.38	3.43
Chicago, Iowa & Dakota	2	2,032 00	2 90	1	260 00	.87	5	2,550 54	1.35	.....	....	.....	1	790 80	2.52
Chicago Great Western	....	....	.....	.....	....	.....	76	47,751 69	1 72	98	51,000 60	1 42	70	88,804.40	3.48
Chicago, Milwaukee & St. Paul ¶	8	53,972.30	18.21	†107	110,368.73	1.75	252	135,440.26	1.73	299	151,716 24	1.62	253	295,885.48	3.73
Chicago, Rock Island & Pacific	....	....	.....	.....	....	.....	168	100,710.84	1.91	190	85,138 08	1 40	173	202,082 04	3.72
Chicago & North-Western	2	6,600.00	10.54	10	15,415.00	4.92	173	108,552.64	2 00	231	117 434 57	1.62	313	336,216 67	3 64
Chicago, St. P., Minneapolis & O.	....	....	.....	.....	....	.....	12	8,960.00	2.38	33	18,897.48	1.82	10	14,239 07	4.50
Sioux City & Pacific	....	....	.....	.....	....	.....	13	9,720.00	2 39	39	22,715.12	1.86	12	17,906.18	4.77
Crooked Creek	1	786 67	2.51	1	741.67	2.37	.....	....	.....	1	286.91	1.13	1	787.50	2 16
Des Moines Northern & Western	7	9,081.59	4 14	11	7,107 21	1.77	25	12,010.72	1.31	.....	....	.....	8	11,254.26	4.48
Dubuque & Sioux City	12	29,757.63	7.89	90	58,574.34	2 07	92	56,143.22	1.83	154	83,118.43	1.26	84	103,422.75	3 56
Des Moines Union	2	2,800 00	3 84	2	870 00	1.59	.....	....	.....	50	21,398 62	1.41	3	2,935.53	2.45
Humeston & Shenandoah	3	6,083 20	6 67	4	3,550 00	.....	12	5,725.15	1.57	1	350.00	1.34	4	3,154.27	3 19
Iowa Central	11	30,399 71	8.80	15	39,118.99	2.27	70	26,825.20	1.26	36	20,930.68	1.61	56	56,363 76	3 80
Iowa Northern	1	600.00	1 66	.....	....	.....	.....	....	.....	.....	....	.....	1	960.00	2.66
Keokuk & Western	7	11,719 92	5.35	‡21	11,898 87	1.63	14	7.372.21	1.44	10	5,462.18	1.33	7	7,319.60	3.37
Mason City & Ft. Dodge	4	6,124 63	4.18	4	2,179.65	1.70	12	6,480 00	1.47	2	176.54	.70	3	3,589.45	2.96
Minneapolis & St. Louis	7	26,041 00	10.19	16	12,745.00	.....	14	9,180 00	2.10	3	1,680.00	1.79	13	15,708.25	3.59
Omaha & St. Louis	5	7,498.00	10.42	11	3,899.42	.....	11	7,636 80	1.90	6	3,960 00	1.81	9	5,948.45	5.00
Sioux City & Northern	5	10,075.00	6.14	20	12,878.20	.....	12	7,455 00	1 63	20	6,717.15	1.45	5	6,894 60	3.64
Tabor & Northern	7	....	.....	.....	....	.....	1	400 00	1 46	.....	....	.....	1	581.10	1.84
Union Pacific	....	....	.....	.....	....	.....	.....	....	.....	.....	....	.....	.....	....	.....
Wabash	1	3,548 15	14.12	6	5,275.85	2.66	9	5,413.79	1.83	20	10,310.14	1.63	10	12,662.28	3.90
Winona & Western	4	1,040.00	3.71	5	948.00	.....	4	2,109 60	1.69	4	560.00	1.49	5	1,452 37	4 17
NARROW GAUGE ROADS.															
Burlington & Northwestern	2	1,233.25	3 93	8	1.867.94	1.49	8	3,234.00	1.29	2	554 00	.88	2	1,679 59	2 67
Burlington & Western	2	1,766.75	5.63	8	2,679.81	2.13	14	5,323 88	1.21	3	874 70	.93	4	4,226.55	3.37
Des Moines & Kansas City	....	....	.....	§16	3,521.38	.....	14	2,648.63	.96	5	1,106.58	1.38	6	2,297.20	2 47
Total	136	$301,410.83	.....	486	$378,871.37	.....	1,345	$765,820 95	.....	1,730	$805,391.01	.....	1,386	$1,601,689 66	.....

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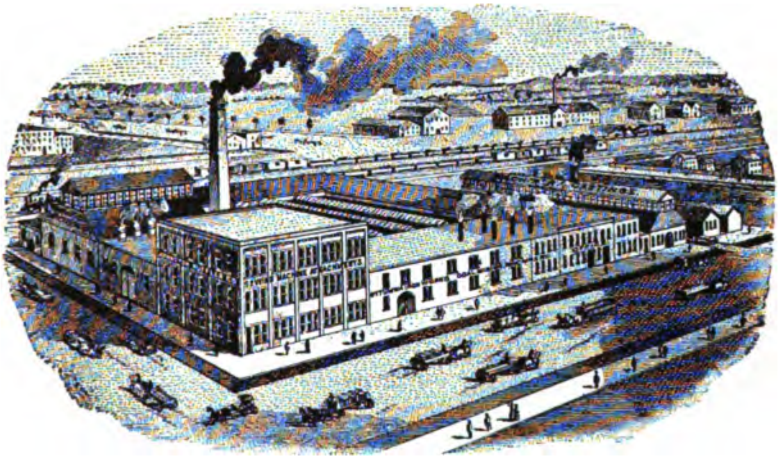
* "Other" officers. † Includes 15 "other officers," average daily compensation $9.11. ‡ Includes 5 "other officers," average daily compensation $3.51. § Includes 2 "other officers," 8 civil engineers and assistants. ‖ Includes 2 "other officers," average daily salary of $2.12. ¶ Train mileage basis.

RAILROAD EMPLOYES AND SALARIES—1896—CONTINUED.

RAILROADS.	FIREMEN.			CONDUCTORS.			OTHER TRAINMEN.			MACHINISTS.			CARPENTERS.		
	Number.	Tot'l yearly compensation.	Av. daily compensation.	Number.	Tot'l yearly compensation.	Av. daily compensation.	Number.	Tot'l yearly compensation.	Av. daily compensation.	Number.	Tot'l yearly compensation.	Av. daily compensation.	Number.	Tot'l yearly compensation.	Av. daily compensation.
Ames & College	....	....	....	1	$ 558.60	$1.51	....	....	....	....	....	....	....	....	....
Albia & Centerville	....	....	....	....	....	....	....	....	....	....	....	....	....	$ 358.79	$2.39
Atchison, Topeka & Santa F.	47	$ 34,693 32	$2.64	41	42,954.72	3.25	86	$ 48,857.88	$2.00	56	$ 27,218.60	$2.24	43	17,683.80	2.15
Boone Valley	1	....	....	1	....	....	1	....	....	....	....	....	....	....	....
Burlington, C. Rapids & N.	128	86,537.50	2 36	86	82,910 88	3.09	167	111,833 28	2.06	90	55,012 50	2.25	185	103,674 00	1.85
Chicago, Burlington & Q.	160	99,557.89	1.74	117	111,865.15	2.66	226	118,142.79	1.46	290	152,459 32	1.69	232	124,270.06	1.77
Chicago, Burl'gt'n & K. C.	10	6,904 21	1.89	9	9,861.60	3.09	16	11,353 56	1.99	....	....	....	....	....	....
Kansas C., St. Jo. & C. B.	2	1,095 50	1.75	....	....	....	....	....	....	....	....	....	1	679 21	2.17
St. Louis, Keokuk & N.	....	....	....	....	....	....	....	....	....	9	6,619.95	2.35	2	1,289.56	2.06
Chicago, Ft. M. & D. Moines.	2	1,557 18	2.80	2	1,825.15	2.68	8	1,826 34	1.84	1	749.45	2.25	1	391.25	1.52
Chicago, Iowa & Dakota	1	420 00	1 34	1	660.00	2.10	2	982 63	1.56	1	530.00	1.94	....	....	....
Chicago Great Western	70	51,873 30	2.03	53	55,302.90	2.86	120	58,668 40	1.34	86	80,415.20	2.28	69	44,850.00	1.75
Chicago, Milwaukee & St. P.	276	198,580.00	2.30	192	199,852.76	2.32	419	254,373 33	1.92	171	143,750 49	2.68	190	133,505 06	2.24
Chicago, Rock Island & P.	170	126.448 56	2 37	110	124,417.56	3.60	223	145,189 04	2 07	114	62,313.24	1.83	153	95,961 00	2.30
Chicago & North-Western	344	236,692.31	2.20	232	233,109 63	3.21	482	301,615.82	2.00	207	127,705 02	1 97	184	115,872 89	2.01
Chicago, St. P., M. & O.	10	8,603 53	2.74	9	10.029 75	3.55	23	14,576 68	2 02	60	82,982 26	2.10	43	26,045.02	1.98
Sioux City & Pacific	13	11,391.04	2.80	9	9,578 00	3 40	20	11,966.44	1.91	47	32,449 27	2.21	69	41,764 34	1.93
Crooked Creek	1	415 70	1.49	1	594 23	1.92	....	....	....	....	....	....	....	....	....
Des Moines Northern & W.	8	7.034.84	2.80	7	4,747 15	3.29	12	6,974.57	1.78	....	....	....	13	7,677.60	1.88
Dubuque & Sioux City	81	60,176 02	1.88	56	63,942.06	3.64	124	84,139 22	2.09	104	46,716.71	2.47	89	40,176 67	2.15
Des Moines Union	3	1,918 05	1.59	....	....	....	....	....	....	12	7,448 96	2.46	5	2,037.09	2.12
Humeston & Shenandoah	4	2,337.61	1.80	3	2,554 96	2.73	6	2,728 42	1.61	4	2,451.82	2.70	10	5,539 75	2.15
Iowa Central	59	32,085.90	2.16	35	28,803 07	3 21	72	35.414.34	1.87	37	12,671.10	2.01	90	33,119.23	1.83
Iowa Northern	1	540 00	1.60	1	600.00	1.66	2	960.00	1 33	....	....	....	....	....	....
Keokuk & Western	7	4,315 27	1.99	4	4,302 42	2.95	7	3,828 91	1.58	17	9,514.05	1.97	22	8,897.75	2.15
Mason City & Ft. Dodge	3	2,335.47	1.92	3	2,661.98	2.67	4	2,418.09	1.72	3	2,202 67	2.50	8	3,892.08	1.84
Minneapolis & St. Louis	18	9,492.25	2.17	11	11,940.50	3 25	23	14.154.00	1.72	2	1,605.00	2.42	6	4,619.50	2 46
Omaha & St. Louis	9	3,212.76	2.65	8	2,765.39	3.75	8	4,332.76	2 50	....	....	....	....	....	....
Sioux City & Northern	5	4,084 15	2.16	4	4,239 55	3.25	12	4,820.40	1.86	4	3,107.45	2.71	8	2,761.80	2.17
Tabor & Northern	1	527.12	1.67	1	389.50	1.24	....	....	....	....	....	....	....	....	....
Union Pacific	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wabash	10	7,429 88	2 22	7	7,808.20	3.50	14	9,378 23	2.18	11	6,744 20	1.99	7	5.222.17	2.27
Winona & Western	6	869.47	2.50	4	767.16	3.80	8	696 94	2.24	2	287 70	2.85	13	917 69	2.12
NARROW GAUGE ROADS.															
Burlington & Northwestern	2	1,275 36	2.06	1	618.78	1 97	2	810.42	1.29	3	2,800 30	2.97	3	1,885.15	2.00
Burlington & Western	3	2,691 45	2.86	4	3,325 83	2.65	7	4,158.22	1.99	....	....	....	3	2,055.55	2.18
Des Moines & Kansas City	6	1,268 75	1.80	5	2,035 85	1.94	5	867 50	1 16	4	1,517.30	1 93	24	2,521.50	1.87
Total	1,456	$1,006,273.33		1,013	$1,027,606 27		2,004	$1,255,076 24		1,275	$769,467.66	....	1,473	$827,068.01	......



OTTUMWA IRON WORKS, OTTUMWA.

RAILROAD EMPLOYES AND SALARIES, 1896—CONTINUED.

RAILROADS.	OTHER SHOPMEN.			SECTION FOREMEN.			OTHER TRACKMEN.			SWITCHMEN, FLAGMEN AND WATCHMEN.			TELEGRAPH OP'RAT'RS AND DISPATCHERS.		
	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.
Ames & College	....	....	....	1	$ 364.90	$ .98	....	....	....	....	....	....	....	....	....
Albia & Centerville	....	....	....	4	2,040.00	1.62	16	$ 4,299.70	$1.10	....	....	....	1	$ 360.00	$1.15
Atchison, Topeka & Santa Fe	233	$ 92,293.20	$1.69	4	2,280.00	1.58	82	14,185.80	.83	11	$ 8,101.20	$3.08	4	2,370.00	1.65
Boone Valley	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Burlington, Cedar Rap. & N.	388	193,784.00	1.60	170	93,075.00	1.50	683	266,570.00	1.25	75	52,650.00	2.25	104	65,869.44	2.03
Chicago, Burlington & Quincy	921	413,823.16	1.45	192	90,960.00	1.41	499	172,407.94	1.19	157	102,148.25	1.79	94	59,742.00	1.77
Chicago, Burlington & K. C.	....	....	....	14	7,224.84	1.41	26	8,138.00	1.00	....	....	....	3	3,240.00	3.00
Kansas City, St Jo & C. B.	24	13,221.12	1.76	12	6,558.32	1.46	44	15,011.48	1.09	2	1,538.70	2.45	4	2,840.16	1.94
St. Louis, Keokuk & N. W.	22	13,083.40	1.90	9	4,763.25	1.45	12	4,244.28	1.13	5	3,802.95	2.43	2	1,430.80	1.96
Chicago, Ft. Madison & D. M.	4	2,113.75	1.62	9	4,980.00	1.51	20	7,778.75	1.29	....	....	....	....	....	....
Chicago, Iowa & Dakota	....	....	....	4	1,710.00	1.36	10	3,445.20	1.10	....	....	....	....	....	....
Chicago Great Western	131	112,722.12	2.36	76	42,210.00	1.58	239	107,973.00	1.24	36	30,414.60	2.31	45	27,479.00	1.68
Chicago, Milwaukee & St. P.	648	347,025.06	1.71	264	157,668.78	1.91	931	352,604.29	2.21	281	177,426.38	2.02	224	138,760.40	2.07
Chicago, Rock Island & Pac.	197	105,888.24	1.68	194	108,472.32	1.78	905	333,716.61	1.17	97	73,385.76	2.41	90	64,824.20	2.28
Chicago & North-Western	695	332,520.38	1.53	223	122,922.62	1.76	817	341,992.53	1.29	188	136,203.32	2.31	102	71,849.36	2.25
Chicago, St Paul, Minn. & O.	7	7,759.96	3.53	14	7,830.00	1.77	40	16,519.19	1.32	13	10,850.94	2.66	7	4,800.00	2.18
Sioux City & Pacific	178	92,739.20	1.66	14	7,200.00	1.64	52	20,875.86	1.28	24	16,097.47	2.14	5	2,700.00	1.78
Crooked Creek	1	518.55	1.42	2	940.00	1.50	4	1,047.84	1.25	....	....	....	....	....	....
Des Moines North & Western	4	2,014.49	1.48	25	13,529.00	1.48	80	29,379.02	1.17	....	....	....	8	3,823.83	1.31
Dubuque & Sioux City	175	89,096.95	1.82	100	50,517.48	1.69	627	109,846.93	1.09	10	3,441.32	1.25	51	31,466.43	2.05
Des Moines Union	14	5,697.68	1.32	1	740.00	2.03	15	6,492.44	1.24	30	15,608.70	1.72	1	480.00	1.33
Humeston & Shenandoah	11	5,369.50	1.91	18	8,094.60	1.48	30	8,764.18	1.13	1	381.25	1.25	2	1,682.00	2.68
Iowa Central	107	58,895.06	1.76	85	41,821.14	1.59	293	72,359.02	1.26	30	19,997.31	2.19	24	9,540.69	1.19
Iowa Northern	....	....	....	1	540.00	1.50	5	2,347.50	1.50	....	....	....	....	....	....
Keokuk & Western	42	17,573.50	1.56	13	6,981.08	1.40	49	11,238.43	1.26	4	2,157.82	1.96	10	4,409.15	1.40
Mason City & Ft. Dodge	13	5,564.26	1.36	14	7,110.00	1.38	71	9,787.70	1.10	1	1,020.00	2.78	2	960.00	1.31
Minneapolis & St. Louis	17	10,475.90	1.97	27	14,640.00	1.73	61	21,002.30	1.10	4	3,060.00	2.28	14	6,780.00	1.42
Omaha & St. Louis	16	8,624.74	1.48	12	5,340.00	1.33	27	9,398.40	1.10	5	4,390.00	2.41	4	2,460.00	1.68
Sioux City & Northern	23	13,188.45	2.09	12	6,179.50	1.64	62	10,762.77	1.25	8	3,116.60	1.38	4	1,848.45	1.52
Tabor & Northern	....	....	....	1	460.00	1.46	4	914.09	1.15	....	....	....	....	....	....
Union Pacific	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Wabash	30	16,231.56	1.72	8	4,645.25	1.79	32	11,460.87	1.16	13	8,409.00	2.11	7	4,260.26	2.00
Winona & Western	9	882.15	1.65	4	2,076.00	1.75	9	3,044.19	1.30	2	192.00	1.54	1	144.00	2.26
NARROW GAUGE ROADS															
Burlington & Northwestern	13	6,280.05	1.50	8	5,556.25	2.21	23	8,305.80	1.15	1	614.55	1.96	2	1,181.70	3.76
Burlington & Western	2	735.45	1.50	12	5,983.35	1.62	20	7,228.05	1.15	2	944.25	1.65	2	590.85	2.26
Des Moines & Kansas City	17	3,568.15	1.48	19	4,615.14	1.33	162	5,302.16	1.11	1	240.95	1.49	2	504.75	1.13
Total	3,942	$1,971,694.98	......	1,560	$839,998.82	....	5,980	$1,938,243.84	......	1,001	$676,128.32	....	809	$515,847.47	......

RAILROAD EMPLOYES AND SALARIES, 1896—CONTINUED.

RAILROADS.	ALL OTHER EMPLOY'S AND LABORERS.			TOTAL, INCLUDING GENERAL OFFICERS.			TOTAL, EXCLUDING GENERAL OFFICERS.			DISTRIBUTION OF SAME.			
	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.	General administration.	Maintenance of way and structures.	Maintenance of equipment.	Conducting transportation.
Ames & College	1	$ 240 00	$ .65	4	$ 1,783.10	$ 1.22	4	$ 1,783 10	$ 1.22	....	....	....	....
Albia & Centerville	3	808 20	.73	27	9,134 49	1.19	27	9,134 49	1.19	....	$ 7,086.59	....	$ 2,047.90
Atchison, Topeka & Santa Fe	63	19,856 76	1.65	744	386,534.52	2 22	744	386,534 52	2.22	$ 11,162 16	19,465.80	$ 149,185.20	206,721.36
Boone Valley	.....	....	.....	.....	....	.....	.....	....	.....	....	....	....	....
Burlington, Cedar Rapids & N	110	67,268 20	1 96	2,775	1,611,872.99	1 85	2,753	1,555,200.56	1.80	113,346.24	455,313.94	558,232 50	484,980.31
Chicago, Burlington & Quincy	72	31,592,61	1.55	3,574	1,864,810 88	1.63	3,560	1.841,519.28	1.61	49,267.60	398,168.87	576,818.35	840,556 06
Chicago, Burlington & Kan. City	7	2,957.85	1.35	110	70,006 79	1 83	140	70,006 79	1.83	....	15,362.84	....	54,643 95
Kansas City, St. Jo, & Council B.	2	1,045.42	1.67	103	50,326 53	1.49	103	50,326 53	1 49	....	22,249 01	13,221.12	14,856 40
St. Louis, Keokuk & Northwest'n	5	2,795.70	1.78	86	48,859.44	1.71	86	48,859 44	1.71	....	9 007 53	20,992.91	18,859 00
Chicago, Ft. Madison & Des M.	.....	....	.....	64	36.618 00	1.70	61	32.628 00	1.59	6,311.50	12,758 75	3,254.45	14,293.30
Chicago, Iowa & Dakota	.....	....	.....	28	13,381.17	.....	26	11,349 17	.....	....	....	....	13,381 17
Chicago Great Western	122	77,387 37	1.73	1,241	826 250.58	1.83	1,241	826,250.58	1.83	....	204,587.68	203,638.67	418 024 23
Chicago, Milwaukee & St. Paul	1,164	638,128.90	1.75	5,669	3,489.058.45	1 96	5,661	3,435,086 15	1 93	164,341.03	804.214.98	521,413.63	1,999,088 81
Chicago, Rock Island & Pacific	117	95,690 52	2 60	2,901	1,723,658 04	1 91	2,901	1.723,658 04	1 91	....	474,085.80	296,059 32	953,512.92
Chicago & North-Western	243	137.674.33	1.81	4,476	2,762,876 54	1.97	4,474	2,755,776.54	1.97	16,087.50	684,655.30	297,217.68	1,764.416.06
Chicago, St Paul, Minn. & O.	38	20,531.99	1.72	309	202 594 87	2.02	309	202,594 87	2.02	....	50.648.72	50,648 72	101,297.43
Sioux City & Pacific	8	4,033 83	1.61	503	301,136.75	1 91	503	301,136 75	1 91	....	35,590 35	101,098.79	164,447 61
Crooked Creek	.....	....	.....	13	6,169.07	1.67	12	5,882 40	1.76	786 67	1.987 84	....	3.394 56
Des Moines Northern & Western	7	4,604.24	2 05	215	122,238.52	1 71	208	113,156 93	1 63	16,188 80	56,694.35	....	49,355.37
Dubuque & Sioux City	294	118,732 43	1.51	2,143	1,029.708 59	1.84	2,131	999,950 96	1 81	88,331 97	242,458 66	196,385.62	502.532.34
Des Moines Union	*28	12,534.52	.....	166	80,981 59	1 60	164	78,181.59	1.56	3,670 00	8,454 70	8,253 79	60.593.10
Humeston & Shenandoah	7	3,427 34	1.50	120	62,944.05	1 86	117	56,860 85	1 73	6,734 20	24,540 97	11,245 02	20,424 86
Iowa Central	63	34,511.70	2.18	1,123	553,006.90	1.92	1,112	522,607.19	1 84	69,518.70	130.739.78	110,381.64	242,366 78
Iowa Northern	.....	....	.....	12	6,547 50	1.60	11	5,947 50	1 59	600.00	2,887.50	....	3,060 00
Keokuk & Western	3	1,273.09	1 62	237	118,264.28	1.77	230	106.544 36	1 69	....	....	....	....
Mason City & Ft. Dodge	1	1,500 00	4.10	148	57,989.47	1.67	144	51,867.84	1 56	8,301.28	20,417.50	10,659 21	18.611.48
Minneapolis & St. Louis	14	8,760.50	2.00	245	171,884 20	2 16	238	145.843 20	1.90	38,786.00	44.402 80	16,700 40	71,995.00
Omaha & St. Louis	.....	....	.....	126	69,466.71	1.99	121	61.968 71	1 81	11,397.42	14.738 40	8,624.74	34,706.15
Sioux City & Northern	29	9,949 15	1 62	233	108,078 22	1.97	228	98,003 22	1.85	22,958.20	19,704.07	16,295.90	49.125 05
Tabor & Northern	.....	57.26	2.50	16	3,389.07	.....	9	3,389.07	.....	....	1,374.09	....	2,014 98
Union Pacific	.....	....	.....	.....	....	.....	.....	....	.....	....	....	....	....
Wabash	15	11,095 05	2.45	200	129.389.88	2 06	199	125,841 73	.....	9,000 84	23,989 28	24,074.85	73,324.91
Winona & Western	9	428.12	1.60	89	16,415.39	1.94	85	15,375.39	1 88	1,316 00	6,229.90	2,269 96	6,599.53
NARROW GAUGE ROADS.													
Burlington & Northwestern	5	2,287.30	2.09	85	40,183 94	1.65	83	38,950 69	1.62	3,101.19	16,148.85	10,965 50	9,968.40
Burlington & Western	5	2,925 15	2 08	91	45,509.84	1.70	89	43,743 09	1.69	4,446.56	18,927.55	....	22,135 73
Des Moines & Kansas City	3	210.60	1 35	289	82,226 43	1.41	289	82,226 43	1.41	....	....	....	....
Total	2,458	$1,312,308 13	.....	28,165	$16,052,796.79	.....	28,033	$15,758,185 96	.....	$ 645,647 86	$3,825,892.40	$3,207,647.97	$8,221,334.75

*On account floating equipment.

THE AMANA SOCIETY.

Following will be found two articles from the Midland Monthly, a magazine published in Des Moines by Johnson Brigham, devoted to midland literature, art, etc., which will give to the people of the state, who are not already familiar with them, a very correct idea of Christian socialism as practiced by the Amana society of Iowa county. The first article, written by Barthinius L. Wick, deals almost entirely with the early history and formation of the colony. The second, by Bertha M. Horak, who was awarded the prize for the best original descriptive paper in the Midland's ninth quarterly competition, closing April 1, 1896, dwells upon the present conditions prevailing therein. These two articles are, in fact, very true word pictures of the only really true Christian socialist colony in this state.

CHRISTIAN COMMUNISM IN THE MISSISSIPPI VALLEY.

BY BARTHINIUS L. WICK.

The stranger riding on the Rock Island or Milwaukee train through Iowa county, Iowa, will suddenly find himself gazing from the car window upon strange surroundings and a unique people. If he alights at one of these little hamlets (there being eight in number) and strolls up the only long narrow street, listening to the children's chattering in a strange tongue, seeing on all sides such strangeness, his mind's eye will lead him to believe he has discovered some new Atlantis and he will be as much at loss to account for himself as was Rip Van Winkle or that more modern sleeper, Julien West. After going about for some time seeking for someone with whom he can make himself understood, he will be told that this is the Amana society, as it is known in law, or the Community of True Inspiration as they call themselves.

Who are these people, where did they come from, and what mode of life do they practice? These are the questions I shall try to answer.

These people are German communists who formed themselves into a religious society in Hessen in 1714; emigrated to America in 1843; settled near Buffalo, N. Y.; there adopted communism, and removed to Iowa in 1855, where they have since resided.

In religious matters the Inspirationists have much in common with the Pietists founded by the Frankfort divine, Spener, about 1670. It arose out of a movement in the Lutheran church by which "it was sought to go back from the cold faith of the Seventeenth century to the living faith of the Reformation." The awakening instituted by Spener seemed to have died with him; still, a few scattered followers held their meetings for worship in private houses and in the fields, so as to avoid persecution. In some of these meetings persons were thought to speak as the prophets of old while under a miraculous influence which qualifies man to receive and communicate divine truth; hence they were called Inspirationists. It was not until 1714 that E. L. Gruber and J. F. Rock fully organized these believers into a society in the secluded little village of Himbach in Hessen, and it is the remnant of this religious organization that we have here in Iowa.

The distinctive religious tenets of these people are, as their names indicate, belief in inspiration, an avoidance of forms and written creeds, and a conscientious refusal to engage in war or take an oath.

The community has no priests no hired ministry, believing that preaching should be under the immediate teachings and promptings of the Holy Spirit and is not limited to any class or sex; nor can a theological training fit one to exhort in meetings unless led by the Spirit.

While rejecting the typical baptism of water, they have accepted in its fullness the heart-cleansing baptism of the Holy Ghost.

Although at times the members partake of the ordinance of communion, it is only as a symbol of an inward feasting with the Lord

Feet washing and love feasts are practiced much after the manner of the early Christians.

Hymns are sung in their meetings, but instrumental music is not permitted.

Vain salutations and useless recreations are looked upon with disfavor, having a tendency to divert the mind from weightier things.

Their benevolent and humanitarian efforts toward all mankind, their strict honesty in trade, the high moral standard set up among themselves, bear ample testimony to their worth as a Christian brotherhood practicing what they preach.

Their natural protest in favor of freedom in religious matters did not harmonize with the despotic demand for conformity which the state at that time enforced. Imprisonment and persecution became the order of the day, but it only seemed to strengthen them in their faith and increase their number.

Meetings were established in Homburg, Neuwied, Ysenburg, Wittgenstein, Alsace and Wurtemberg.

About the middle of the Eighteenth century the gift of inspiration ceased and the society made little progress, until 1817, when three persons received this remarkable gift, again reviving the old enthusiasm. Two of these came to America, continuing their remarkable gifts of prophecy until their death some years ago, and since then none has been gifted in this direction.

The laws of Switzerland, Alsace and many of the petty German kingdoms were severe on these people on account of their refusal to bear arms and to take oaths; thus most of them came to Hessen, where the laws were

THE BURG WAGON CO., BURLINGTON.

enforced with less rigor. The society supported the exiles and leased several estates and factories in order to procure employment for all. The society paid the rents, while the income from the estates and the products manufactured was divided equally among the workmen according to their ability and time spent at work.

Here we have the first beginnings of the communistic life which the society afterwards adopted, arising unconsciously from small beginnings, with no thought of the result which would flow from it

Although petitioning government for more freedom in religious matters the yoke daily became heavier to bear. At last the society drew up its last imploring appeal in 1841; but it was in vain. About this time several members became subject to inspiration, to the effect that a great future awaited the faithful in another land, where they should enjoy freedom, equality and brotherhood, and adopt a community of goods.

The society met in a body to decide upon this strange doctrine and upon the question whether or not it was the sense of the society as a body to remove to a foreign land. As these questions were decided in the affirmative, Christian Metz, G. A. Weber, Wilhelm Noe and Gottlieb Ackerman, were selected to depart for America in search of a favorable location.

Arriving in New York in the fall of 1842, the committee visited several places in that state, at last going to Chautauqua lake. What might not have been the change had the Inspirationists settled at that place, which has since become such a famous educational center! It must be borne in mind that the Chautauqua of to-day can scarcely be compared with the Chautauqua of a half-century ago, when Erie was the nearest town. After a tedious journey to this place the committee become frightened from the thought of pioneer life and consequently returned to Buffalo, where they purchased 5,000 acres of the Seneca reservation at $10.50 an acre, the land lying within six miles of the city limits. This purchase was unfortunate, however, as the Indians asserted their so-called rights, while the land company from whom the Inspirationists had bought the land was unable to furnish a title, and consequently all concerned became involved in litigation which lasted for several years, and which was finally settled to the satisfaction of the settlers, but not until it had cost them much trouble and considerable money

By the spring of 1843 fifty immigrants had arrived and the first Inspirationist village was solemnly laid out, receiving the name of "Ebenezer,' taken from 1st Samuel, where it is said the prophet set up a stone as a memorial of divine assistance in a battle against the Philistines. Their battle had been a combat for truth and for freedom of worship, which had been denied them in their native land, and which they now hoped to enjoy unmolested.

In another year all the immigrants, 800 in number, had come over, and the articles of incorporation were signed and duly filed as a communistic society.

Why was this new, untried scheme adopted, a scheme of social innovation which has for its basic principle the overthrow of private property and the abolition of an institution on which society has always rested? Was their idea the same as the old rhymer who says:

"Who is a communist? One who hath yearnings
For equal division of unequal earnings;
Idler or bungler, or both, he is willing
To fork out his penny and pocket your shilling."

Far from it, there can be found no selfishness as a reason for the r course. All the needy had been promised a free passage across the ocean, but nothing more. True, it had been revealed by the inspired ones in Germany that "a community of goods and an equality of conditions" should be adopted in this new home; but still the more conservative had doubts as to its feasibility. Perhaps on account of this intended new venture many remained behind, unwilling to mingle their shillings with the pennies of others, and expecting an equal division of earnings. Still more of the poorer classes feared to come than of the wealthy class. The conditions of the average life of the middle class had been carefully studied, and the squalor and misery of the New York poor which, even at that time hung like a cloud over the lives of the working classes, was not a pleasant prospect of what awaited their own people if they were permitted to seek their bread in the same manner. It was plainly seen that if they should exist as a religious society they must keep together. But, as there were rich and poor among artisans, as well as farmers, there seemed but one alternative to pursue, to adopt communism as the only method by which equal wealth and equal opportunities would place the members on an equal footing socially.

It was after much deliberation and prayer that this course was chosen, and the wealthy placed their thousands in the hotchpot as willingly as those who had only a few dollars, each person receiving credit on the books of the society for his sum, which the society pledged itself to pay, without interest, at any time, to him, his heirs and assigns, whenever they saw fit to withdraw from the community. History relates many deeds of philanthropy, where wealthy individuals have given large sums to their less fortunate brothers, or to worthy institutions; but in these cases where thousands were donated the giver still possessed millions with which to satisfy every whim luxury might suggest. We hear of generous men and women leaving vast fortunes to be used for the good of humanity, but these legacies were left by will, to take effect after the devisors had passed to that other shore, where their gold would be of no value. But the Inspirationists, while in the prime of life, with families depending upon them, strangers in a strange land, willingly parted with every dollar, took their stand in the ranks side by side with those so poor that they had been unable to pay for a passage across the ocean.

This, to my mind, is one of the finest tributes in history to German benevolence and German liberality. If communism shall be destined to succeed at all, it must succeed when the founders are imbued with such a spirit and possessed of such an indomitable faith in the success of the experiment.

In Owen's experiment, it was only the founder who possessed this faith.

The Brook farm promoters were blind æsthetics, looking at life through magnified spectacles and sighing for a corner in this world where the throbbings and tumults of selfishness should yield to the magic of equality and brotherhood.

The Icarians set out with too high ideals, forgetting to recognize the existence in humanity of one potent element which will always prevent their perfect development, and that is the element of self.

The German Inspirationists, on the other hand, had been despised and persecuted, had suffered from wrong and oppression, and hence any change would be a change for the better; and besides this, they were sustained by the thought that in their choice of this new mode of life they were guided by the Divine Hand. It is not at all surprising that, with their practicability, they should have succeeded where others had failed.

The success of the new experiment was assured from the first. However, the leaders soon saw that close proximity to a thriving city, such as Buffalo, would in the end prove destructive to their community. Thus, in order to realize more fully their ideal dream of an altruistic world which they had set out to build up, a committee was chosen in 1855 to select a more favorable location, where their simple creed could be practiced, in some isolated locality out of reach of an ever-meddling humanity. The committee, coming to Chicago, had no idea where to go farther; but, as Iowa was then coming into notice, and immigration was moving in that direction, the Inspirationists followed the current as far as Iowa City, then the capital of the state. After traversing on foot and horseback over a greater part of the eastern half of the state, the present location in Iowa county was chosen.

Eighteen thousand acres were purchased in one tract, the purchase price being from $1.25 to $5 per acre, the few scattering settlers receiving the latter price only. The same summer a large number arrived from Ebenezer, and the new village was laid out, receiving the name of Amana. The gently-sloping hill described by Solomon in his song resembles, perhaps, in beauty of surroundings, the place to which the members gave the same name—but there is a significant meaning in the word Amana which undoubtedly led them to select it. It means "remain true," a motto from which they have never wavered. Several years were spent in disposing of the Ebenezer property, and it was not till 1865 that the last foot of land had been converted into money, and all the members, 1,200 in number, were united on their Iowa possessions.

Now, a word as to how far this communistic ideal has been realized. The membership has increased from 800 to 1,700. This increase is mostly from within, for very seldom does an outsider join. Of course, in this time, many members have for various reasons left the society, but, so far as I have been able to ascertain, few have succeeded financially, nor have they become entirely accustomed to the new surroundings, their communistic training no doubt being the main reason.

The communistic property also has increased, mainly from the rise in price of land, which now numbers 25,000 acres, and manufactures valued at $50,000. Their entire assessed value, based on 33⅓ per cent of actual value, is upwards of $425,000. This seems a large sum for one corporation to own; still, according to statistics collected by me a few years ago, I find that communistic labor, even in the most successful community, falls behind in productiveness. The assessment in the state per capita for 1890 was $273.65. In the same year the assessment per capita in Iowa county was $271.11, including the Amana society, the assessment of the Amana Society being $250.57.

These figures may not be a fair test of the efficiency of communistic labor, for I was told that at the time the society had a more than average number of non-productive members, who were incapacitated for labor by old age, and that the number of children, who are to a great extent non-productive, was nearly 500. All these the society has to support without much return, and as non-productive members vary from year to year, the statistics for one year would hardly be a fair test.

It must be borne in mind that the community was organized not for gaining worldly wealth, but "to promote the spiritual and temporal happiness and welfare of its members." If a society should be organized having for its chief end the acquisition of property, life would soon become irksome and unbearable, and the society would break up in a short time. It is just this ease, freedom from care and worry, the hope of spending his declining years amid plenty and among generous friends that makes the communist content with his condition.

The family life at Amana has been kept sacred, each family having its own house and garden, although all dine at the public "kitchen," of which there are several in every village.

The oligarchical nature of the community, in intrusting the interests of all to the wisdom of a few, is an advantage which has been demonstrated time and again in co-operative unions.

The system of village life which has been adopted has preserved a sort of isolation of the different groups, while the villages are not far enough apart to interfere in the least with the community feeling. It had preserved their simplicity of life and prevented many evils which would probably result from crowding all into one town. Besides, every village is supervised and controlled by trustees, who report to headquarters at stated times; hence, in every village we have, on a small scale, the old Teutonic, independent, local social organization.

The use of the German tongue is another tie which binds the members closely together. In the divisions and subdivisions in Europe it has been demonstrated time and again that the three most powerful concomitants of national life have been a common origin, a common religion and a common tongue, and this rule does not fail when life is not national in any sense, but where men and women live in a small community whose aims, beliefs and principles are identical.

I visited several of our middle-western cities just before the crisis of 1893, and was surprised at the business activity and wild, speculative ventures of the people. I also stopped for a few days at the community. While there I enquired why they did not increase the capacity of their plants and otherwise extend their business. The members replied that it was true, just at that time, they could double their capacity and still find a market for their goods; but they thought it hardly safe to extend their manufactures by borrowing capital and employing more hired help. They were realizing a handsome profit and were satisfied. The crash came: banks and factories closed; thousands of employes were out of work: the docks and piers of New York were filled with idle men begging for bread: the streets of Chicago were crowded with unemployed men in the prime of life asking for work and supported at the expense of the city and from charity. After seeing such a state of affairs I happened once more to visit the Amana community. There everything went on as of old. The hum of the factory was still heard; neither capital nor labor was idle; the members were as well housed, fed and clothed as formerly, and every member was apparently as contented and happy, and without anxiety about the morrow

The cause for such prosperity in the midst of adversity was no doubt "the transformation of private and competing capitals into a united collective capital," managed by shrewd, practical, honest managers, who employed all the concentrated capital in a diversity of ways, bought and sold for cash, and when the crash came were indebted to no one, and could go on and manufacture for future demand or could simply let the factories remain idle, owning every dollar invested in the enterprise.

AMANA COLONY.

BY BERTHA M. HORAK.

"Behold how good and how pleasant it is for brethren to dwell together in unity."—*Psalm, cxxxiii. 1.*

Southeast of the center of Iowa stands a group of little villages, so unlike the neighboring towns in their arrangement, with people so different in customs and in dress from the people one is accustomed to see, that the visitor finds it difficult to realize he is only a few miles from Iowa's capital and not in a foreign country. Eight villages compose this picturesque little group, the home of the Amana Society or Community of True Inspiration.

The "colonies" are in the northeastern part of Iowa county. They are situated on both sides of the Iowa river, the usefulness of which stream has been increased greatly by the construction of a mill-race—a canal seven miles long, which furnishes the water-power for the several factories and mills scattered throughout the settlement. The mill race, with its fringe of grape vines and pickerel weed and the quaint little bridges that span it here and there, is as pretty as it is useful, and furnishes a never ending source of enjoyment for Amana summer visitors.

Half way between Amana and High Amana, with the mill-race running through it, is a beautiful little lake, which is bordered sometimes to the width of sixty feet with the American Lotus or Yellow Nelumbo (*Nelumbium luttum*). It is worth a journey of many miles to see this little sheet of water in the month of July, when the lotus lifts hundreds of great buff blossoms above the water. The seed of the lotus, when ripe, is about the size of a small hazel nut, perfectly round, and hard enough to admit of a high polish. Every fall a priest from one of the neighboring towns collects these seeds in great quantities to be used in making rosaries.

Each colony is a cluster of from 50 to 100 houses, arranged for the most part along the main street or road. And how unlike the main street of the common country town! Instead of a ragged row of business buildings where the neighboring farmers' collect to discuss politics and the corn crop, we find on either side of the street a neat row of vine-covered houses—the only places of business being the store at one end of the street and the hotel near the other. Here the usual noise and bustle of the country store is wanting, and even the hotel has about it a quiet, soothing atmosphere.

Every now and then an ox-cart comes meandering down the pretty little street. These great, patient, slow-moving animals would be strangely out of place in our own hurrying streets, but are in perfect keeping with the easy, steady, systematic movement of the colony. The use of these animals is a matter of economy with the colonists, as the ox, when speed is not required, can be used longer and worked harder than the horse, and, when no longer profitable for hauling, can be fattened and used as beef.

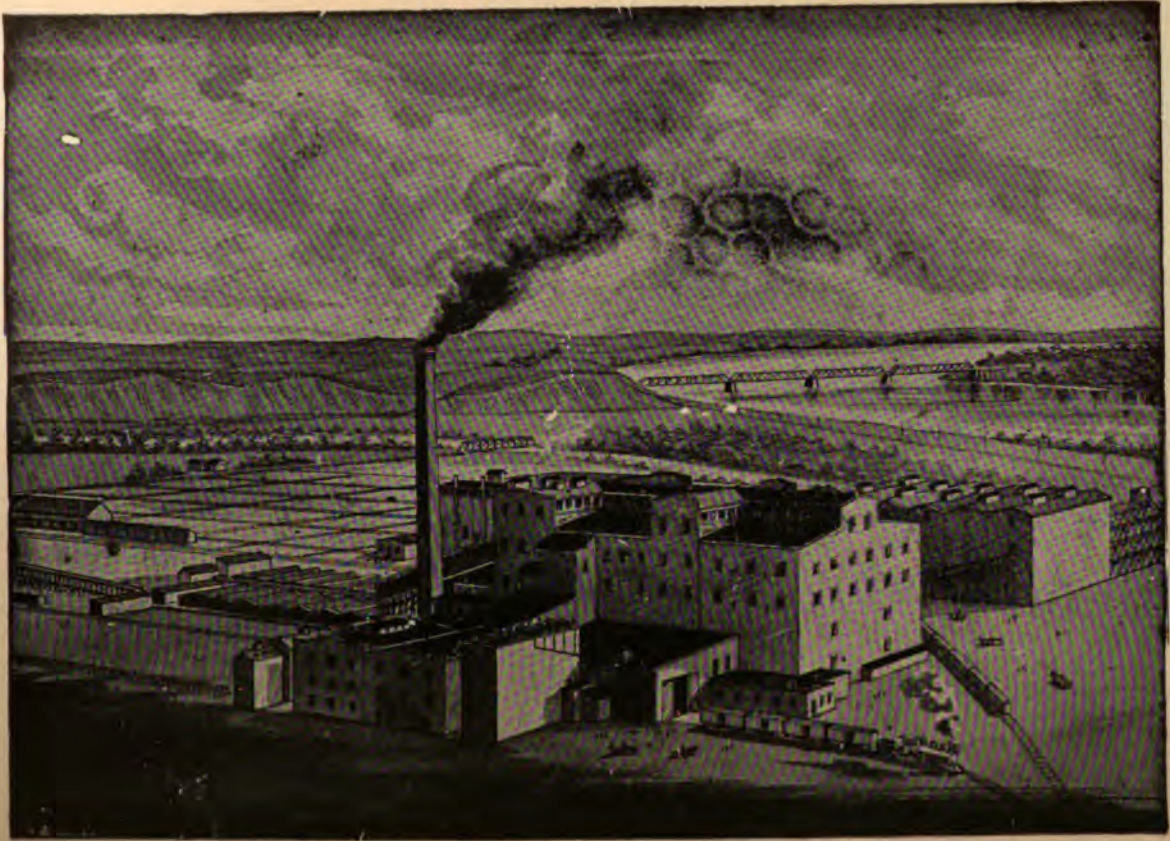
One never sees the colonists collecting in any considerable number on the street. When they meet they usually greet each other with a shake of the hand and pass on—leaving the silver question, the latest candidate for the presidency, and other questions of the day untouched, or reserving them for some more appropriate place for discussion.

The houses are two, sometimes three, storied structures of frame, brick, or a peculiar brown sandstone that is found in the vicinity; and some, as if to add still greater variety to the scenes are built of all these materials. The frame houses are all unpainted, the colonists believing it to be more economical to rebuild when occasion requires than to preserve the buildings a little longer with paint. In summer the severe aspect of the houses is softened by the vines which partly cover dwelling house, school, church and hotel alike. These vines are trained over a framework a few inches from the building itself, so as to prevent any injury to the wall, and afford a better support for the vine. For these vines are not simply the ornamental ivies, but grape vines, which serve the purpose of shade and protection in the summer time and yield an abundant harvest in the fall. Here and there the trumpet-vine with its brilliant flowers will be seen climbing a trellis in company with the grape, it having won its way into the hearts of the people by its attractive blossom. But the woodbine, which has neither blossom nor fruit to recommend it, is not to be found, except where it creeps in unnoticed in some uncared for spot.

These houses are occupied by one, two, or three families, depending upon the size of the house and the size of the family. There is no crowding, however; the same spirit that led these people to believe that the purity of the society could better be maintained with more villages and fewer in a village has led them to provide plenty of room for their people. In spite of the fact that everything within these several colonies is held in common, each man's home is his castle. Here he is at liberty to indulge his own taste in decoration—provided he does not go beyond his allowance. Here each child has a room to himself, where he may indulge his own hobbies and store his own keepsakes without being disturbed.

Two underlying principles govern the entire community—economy and utility; yet in one thing these seemingly ever present motives are set aside, and that is in the matter of flowers. Around every house, even in the hotel and school yards, there are carefully kept flower gardens. Such masses of bloom! Such a display of color! Such a collection of quaint, old-fashioned flowers—petunias, marigolds, chrysanthemums, "pretty faces," bachelor's buttons, six-week's stock—with here and there a bed of geraniums, a rose bush or a flowering shrub.

There are several "kitchens" in each colony, by which is meant the houses at which the people take their meals. Long before the idea of co-operative housekeeping had dawned upon the minds of ardent reformers



STOCK YARDS AND PACKING HOUSES, SIOUX CITY.

as a solution of the domestic problem, the colonists had decided that this was the most economical mode of living. From sixteen to forty eat at one kitchen, the number depending largely upon the location. The places are assigned by the trustees.

The kitchen proper is usually a small room furnished with a long, low brick stove with an iron plate top. Back of this is a sheet of tin several feet high, which shines like a mirror; from its upper edge hang a great variety of strainers, spoons, dippers and ladles. Everything from floor to ceiling is kept scrupulously clean. During my visit at the colony last summer I took a picture of the hotel kitchen. When I returned this year the housekeeper confided to me her chagrin on finding that the towel in the kitchen was not clean at the time the picture was taken, explaining just how it happened that it wasn't changed at the proper time. I had not noticed the presence of the towel at all, but to her it was the most conspicuous object in the picture. I tried to convince her the spots she saw were only shadows, but I am afraid I did not succeed.

It is one of the religious principles of this quiet, gentle people to care for those in sickness or in want, a fact the tramp element has not been slow to learn and take advantage of. At certain seasons of the year the community is overrun with tramps — all posing as victims of misfortune.

The hotel-keeper at Amana is also marshal of the colonies. He has the sternest face and the kindest heart that were ever combined in one personality. His naturally keen eye has been trained by years of observation and experience to distinguish between the professional tramp and the really unfortunate and worthy wayfarer. Every year some poor young fellow who has drifted into the colonies with the tramps is cared for and given employment until he is once more able to "stand upon his own feet," then they bid him godspeed. They are continually hearing from some of these men or from their friends, reports which prove their efforts have not been in vain.

The year after the Chicago fire, a party of tramps came to the hotel at Amana and asked for something to eat. As they ate their dinner the hotel-keeper sat some distance away and watched the party with half closed eyes. One of the faces attracted him, for he said, "I knew by his eyes the man had seen better days." After dinner this man asked for work and without a moment's hesitation it was given him. He was a good workman, and little by little he told his story. He was the son of an eminent optician in Switzerland He was educated as a civil engineer; had a beautiful home and was brought up in luxury. But he and his father quarreled one day and, in a fit of passion, he sailed for America. After roaming about for some time, he opened an office in Chicago and was doing fairly well when the fire occurred. His instruments were burned. He was friendless as well as penniless. He would not write home for money and, in desperation, he wandered from place to place begging for food and shelter, finally falling in with the colonists. Some of the less credulous of the community were inclined to doubt the story, among them the doctor — who decided to test the man's ability in mathematics. Accordingly, the next time he met him he gave him several problems to be solved when he found time. To the doctor's surprise the man replied, "Why I don't need time to work those — I can work them in my head. The results are so-and-so." After this he was known as "the engineer." He worked at the colony several months and then informed his benefactors he was going home. He was given his money and disappeared. Eight months passed by when the hotel-keeper received a letter bearing a foreign postmark. It was from "the engineer." He told of his safe arrival, of the rejoicing at home at the return of the prodigal son, of his reconciliation with his father, and ended by saying, "If you could see me with my broadcloth suit, my gold-rimmed eye-glasses, and my 'stovepipe' hat, you wouldn't believe it to be the tramp engineer who worked for you last summer. I shall never forget you, and I am not ashamed to tell my family and friends that I once carried bricks for the colonists at Amana — God bless them!"

The typical "hobo" described so graphically by Josiah Flint is an entirely different character to deal with. He haunts the neighborhood and takes every possible advantage of this peace-loving people. He wanders from kitchen to kitchen, from village to village, sure of one meal at each place. He then disguises himself and makes the rounds again. He may be successful during part of the trip, but he never deceives the keen-eyed marshal a second time.

Some ten years ago a tramp came to the hotel with no attempt to disguise his "profession"; he was given a meal or two and went on in search of fresh fields and pastures green. Eight years later he returned, this time in the role of a poor, unfortunate man, out of work and far away from home and friends. and humiliated beyond expression at being obliged to beg for bread, as he had never done anything of the kind before. His story was interrupted by the marshal, who informed him that he had been there before and that he knew him very well. The tramp protested; but the marshal replied, "You were here eight years ago. You are known on the road as 'Hobo Charley' and you have one tooth out here" (pointing to a left bicuspid). This was too much for the gravity of the tramp, who burst out laughing—and, sure enough, the tooth was seen to be gone!

The colonists, like the Quakers, carry no firearms except in the most extreme cases Even the marshal is loth to carry a revolver, although he has at least on two occasions almost lost his life for lack of one. The vagabonds who roam about in this vicinity are keen enough to become acquainted with this fact and are, in consequence, frequently emboldened as they would not be otherwise. Some time ago the marshal hearing of a troublesome "gang" who were camping in the neighboring wood, and fearing the spreading of fire, went in search of them, this time with a revolver. When the "gang" saw him coming they jumped up and attempted to pin his arms to his sides. With a quick movement the marshal pulled out his weapon, much to the astonishment of the cowards, one of whom exclaimed, "Gosh, didn't know *you* carried a pop!" and took to his heels.

One morning that summer our hero, the marshal, was less fortunate. A "pot gang" had built a fire dangerously near a field of stacked grain Alone and unarmed he attempted to rout them. Two of them—there were fifteen in all—jumped at his throat and would have made way with him had not one of the party—a German tramp who had been befriended in the colony the day before—run to the factory for help. This was in the morning, and in the afternoon one of these same tramps, a most repulsive looking individual who, in addition to his loathsome dirt and rags, didn't seem to have a redeeming feature in his face, came to the hotel, asked for food and said he was disabled by a carbuncle under his arm. He was taken in and while he ate his dinner the doctor was called. The afflicted member was dressed and when I left, a week later, he was still about the premises under the doctor's care. Was there ever a more Christ-like spirit! When asked how in the face of all that had happened he could care for this man, the hotel-keeper quietly answered, "He was sick." And the questioner felt rebuked.

Throughout the entire settlement the same spirit is shown. "Malice toward none and charity for all" can be read upon every face that passes by. Generations of right-thinking and right-living can be seen on the faces of the colonists. They need no garments of white, as *Die Weisen* of old, for their faces are a better index of the pure, the noble, the spiritual lives that they lead than any spotless robe.

There is an indescribably restful atmosphere about the colonies Nowhere is work done more thoroughly than here; but, where each member of the community, young and old, does his honest share, the individual burden is not heavy. There are no drones in this hive. Everyone is busy, but no one is hurried. Everyone does his work conscientiously, but seems singularly free from worry.

The fact that very few children are seen by the average visitor has led many to believe and some to make the statement that there are not many here. This is a mistake. There are just as many little people to be found here as in any community of the same size. Long before the ordinary pleasure-seeker starts on his exploring tour, the boys and girls between the ages of 5 and 14 are hard at work at school. Here they may be found six days in the week, all the year round. The sessions open early and close late—with the exception of Saturday—and there are no vacations. To those of us who are accustomed to the short sessions and long vacations of the modern public school this at first thought seems almost cruelty to the children, but a visit to *die Schule* very soon convinces one that these children fare quite as well as our own little people.

As each member of the colony has his or her own appointed work to do—work which frequently keeps the parents away from home all day—the children must be taken care of, and the school largely supplants the home training of our children. That it is in every sense adequate, everyone who has visited the school must acknowledge. Never have I seen a group of children so uniformly well mannered, pleasant spoken, courteous and thoughtful as in the colony school.

What would seem like an otherwise long, tiresome session is broken up into three parts—*die Lehr-schule*, where all the common branches are taught, *die Spiel-stunde*, or hour of play, and *die Arbeits-schule*, where the girls and boys alike are taught to knit and sew, to care for the flowers and gardens, and in many other ways to become useful members of the community.

During our last visit in Amana we gave the knitting teacher candy to be distributed during recess, at which time luncheon is served to the children in the two vine-covered arbors, one for boys and one for girls—for here as everywhere throughout the colony they are separated. Before the candy was distributed, the children named over one by one the schoolmates who were absent, and their share was put away first, then the remainder was divided among those present. After the candy had disappeared, every boy and girl, without a single exception, came to us, offered a hand and thanked us in the most unaffected manner and invited us to come again. As we sat in the arbor, one unfortunate little girl whose mind was evidently a blank, came bouncing in. Two of the older girls quietly arose, removed her sunbonnet, smoothed her hair, adjusted her little black cap, and led her gently to a bench near by—an act so spontaneous, so considerate, that it was an effort for those of us who saw it to keep the tears back. We no longer wondered at the universal nobility of character, kindliness of manner and genuine thoughtfulness of the men and women of Amana colony.

While from the outside the vine-covered schoolhouse with its white-curtained windows and its neat flower beds is likely to be mistaken for a dwelling, the interior with its blackboards, charts and globes is not unlike our own schoolrooms, with the exception of the unpainted woodwork and the sanded floors. The teachers in the school proper are all men, but there are women among the "working teachers."

Much of the reciting is done in concert, and, in the primary department where the little ones learn to spell by syllables, fit the syllables together and pronounce the word, the result is a sort of chant, the rhythm of which is fascinating. This same chant may be heard during the long recess, when the children play their quaint little games—quaint to us because of their setting, but in reality only equivalents of the "London Bridge," "King William," and "Drop the Handkerchief," of our own school days.

The children under 5, whose parents are obliged to be away from home during the day, are kept in a nursery well supplied with toys and sand-piles.

The dress of both men and women is plain in the extreme. Utility and not adornment is the chief regard. There is nothing characteristic in the dress of the men aside from its severity. An Inspirationist is readily recognized anywhere by the short, round beard under the smooth-shaven chin. The dress of the women can never be mistaken for anything but the Amana dress. Fashions never trouble them. The dress of to-day is the same as it was at the founding of the colony. Mothers and daughters, grandmothers and granddaughters dress alike—not in the sober grays of the Quakers, nor the more brilliant purples of the Amish, but in plain calicoes of gray or blue or brown. The waist is short and very plain, the skirt long and full. An apron of moderate length, a "shoulder shawl" of calico, and a small black cap completes the summer costume. The only head-gear is a sunbonnet with a long cape. The winter dress differs from this only in being made of flannel; a hood takes the place of the sunbonnet. Thirty-five dollars for clothing is allowed each member of the colony annually. A seemingly small sum, but sufficient when we remember that the clothing is all of the simplest and that this year's dress will answer for next year and for the year after—in fact as long as it will last.

The secret of the prosperity of this communistic body is said to be the religion which binds its members together. The truth of this even the casual observer must recognize. Their religion is not a thing to be put aside Monday morning with the "best clothes" and donned on the following Sunday, but a thing ever present with them—a part of their every-day life.

It is interesting to note that while in so many respects the society is like one large family, still they seldom collect in large numbers—not even in their devotional exercises. There are several chapels in each village where the people assemble in small groups for evening prayer. The church is a large, narrow building, divided into several rooms, one in front of the other. For the usual Sunday service the girls and young women, not necessarily unmarried, assemble in one room, the boys and young men in another, while the older members assemble in a third. The wraps are all left in the hallway. Periodically there is a general meeting on Sunday afternoon in a fourth room—a very large assembly room. The church and its interior, like the colony dress, is marked by its severity. The whitewashed walls, the bare floors and the long, unpainted pews and woodwork all bespeak the character of the service. There is no pulpit; instead, a plain pine table with the simplest of cover. At this table the presiding elder sits. On either side of him facing the congregation is seated a row of elders. These are chosen by the people from the most spiritually inclined of the community. There is just one aisle in the church, a wide center aisle; on either side of this there is a row of long, well-scrubbed benches or settees. In the general meeting the men are grouped on one side of the church, the women on the other, both according to age—the younger members on the front seats, the older members behind. The silence in the church is almost absolute. There is no organ but the mingling of the clear, strong voices of the younger members with the deep, often tremulous notes of the older ones in the chanting of the psalms is more charming than any organ voluntary or Sunday morning solo. The absolute lack of outward show, the simple, earnest, devout spirit of the service, makes one feel that these people are very near "the great white throne."

The perfect equality maintained by the colonists is shown even in death. In the cemetery there are no family lots, no monuments The departed members are placed side by side in perfect rows, regardless of family ties. The graves are all marked by a low, white-painted board slab with the simplest kind of an inscription on the side facing the grave. The grass in the cemetery is carefully trimmed, but there are no flowers there.

While the colonists have to a certain degree tried to keep aloof from "the world," the latter, like Mahomet, has gone to the mountain, and has left its footprints in the form of modifications of the former austerity of the community. Rag carpets have taken the place of sanded floors in many sitting-rooms, ornamental trinkets are hung upon the wall, and here and there a piece of upholstered furniture is to be found. A few years ago instrumental music was strictly forbidden; now one occasionally hears the distant notes of the violin or the deeper tones of the accordion.

"What will the next half century do for the colonies?" the visitor asks; and he is likely to follow up his question with expression of the hope that the Amana society may prosper as it has prospered in the past, and that its purity and simplicity may be preserved.

MANUAL TRAINING SCHOOLS.

The law regulating this office requires that the commissioner shall include in his report what progress has been made with schools now in operation for the instruction of students in the mechanic arts, and what systems have been found most practical, with details thereof.

Following will be found reports from superintendents of the only two cities where manual training is taught in the state, namely, West Des Moines and Mason City schools:

SUPERINTENDENT COOPER, OF WEST DES MOINES, ON MANUAL TRAINING.

The work in manual training has been carried on with excellent results. There is no department of work in the high school which contributes more to the power and independence of pupils than the manual training. It is to be regretted, however, that more use is not made of this department by the boys and girls of the high school. Although the work of the department is put upon the same footing with other branches of instruction and is conducted with judgment and skill, the number of pupils electing the work is not as great as its importance as an educational means warrants one to expect. It is my belief that when the patrons of the school come to understand more fully that manual training as a school study fits for life more completely than any other study endorsed by long usage, no matter what particular work one may pursue, the number of pupils choosing manual training as a study will be greatly increased. The number now in the manual training classes is almost as large as our room and equipment will accommodate, but I would be glad to see it more popular, because I believe in its educational value.

The introduction of the Sloyd form of manual training work into sixth grade of the Franklin school last year was attended with some drawbacks which necessarily interfered with the quality of the results. The pupils were obliged to go to the high school, four blocks distant, and to give some time after regular school hours to the work. The accommodations being limited, only half of the class could be taken care of at a time, and as Instructor Newell could give time only every other day, the pupils received a lesson only once in four days. In spite of these difficulties, the work was so far a success that its extension is recommended for the coming year, and arrangements will be made whereby both the sixth and seventh grades at Franklin can be accommodated upon school time, an lessons given each class twice a week. Mr. Newell's report follows:

MANUAL TRAINING DEPARTMENT, MASON CITY SCHOOLS.

REPORT OF MANUAL TRAINING DEPARTMENT.

DES MOINES, Iowa, June, 1896.

Mr. F. B. Cooper, Superintendent of Schools, West Des Moines, Iowa:

DEAR SIR—In reply to your request I am pleased to submit the report of the manual training department, and I hope I may touch some points that will be of interest to you and to the patrons of our school.

When I entered upon my duties two years ago I found a well equipped department. Believing that manual training is a means of education, I began my work with enthusiasm, and have tried to bring my department into as close harmony with the rest of the school as possible. The *end* of education is always the same. Education is intended to develop the mind's powers and capacities. The *means* of education varies from age to age, and should depend upon the capacity of the child's mind and the character of its environments. Dr. Nicholas Murray Butler says: "Manual training is mental training through the hand and eye, just as the study of history is mental training through the memory and other powers." Ideas can be expressed by means of language, gesture and construction. To train both the powers of reception and expression the child must deal with objects themselves and not alone with a description of them. As a means of expression drawing ought to be taught in every grade of the public school, but only incidentally as an art. In all constructive work the material used should be adapted to the child's age and powers. The means of giving an ideal education has varied from age to age. This is an age of industrial activity, and the child must be so educated that the busy life he is soon to enter will not be altogether strange to him The "all-around" mechanic is no longer educated in his father's shop or on the farm. Most of the objects for household use that were once made in the home are now made in large factories, and the persons working there learn to do only one or two kinds of work. The factories have "No admittance" written over their doors, and the young people of to-day need industrial education, and it ought to come through the public schools. Manual training creates a love for bodily labor, and does much to dispel that false idea that it is more dignified and honorable to clerk in a bank or store at $3 a week than to do cabinet work at $3 a day. Speaking of manual training, Dr. Butler says: "It is the educational question of the time."

Having an equipment suitable for giving a two years' course, and constantly keeping in mind the educational advantages of manual training, I have tried to arrange the details of the work in such a manner that the pupils would obtain the maximum benefit. Our course is arranged as follows:

First year's work —Mechanical drawing, 45 minutes per day; wood joinery, 45 minutes per day.

Second year's work.—Mechanical drawing, 45 minutes per day for nine months; wood carving, 45 minutes per day for three months; wood turning, 45 minutes per day for six months

Mechanical drawing is the foundation upon which we build Much attention is given to the theory of drawing and the principles of descriptive geometry. A number of problems in plane geometry are given first, and these are followed by exercises in orthographic projection. Our pupils learn to make working drawings, tracings and blue prints of the models used as exercises in the courses in wood joinery and wood turning. In the second year the work in drawing is a little more of a technical nature and consists of problems in orthographic projection, practice in making drawings of machinery, screws, gearing, etc. Some problems are also given in perspective and isometric projection.

The exercises in the wood joinery department have been considerably changed during the past two years, and the Russian form of models has been almost done away with. Some of our models are joints or exercises given for practice in the use of tools, and these are followed by constructed objects which are complete and useful articles when finished. The same plan is followed in the course in wood turning. Most of the models are smaller than those formerly used, so the expense of lumber has been reduced.

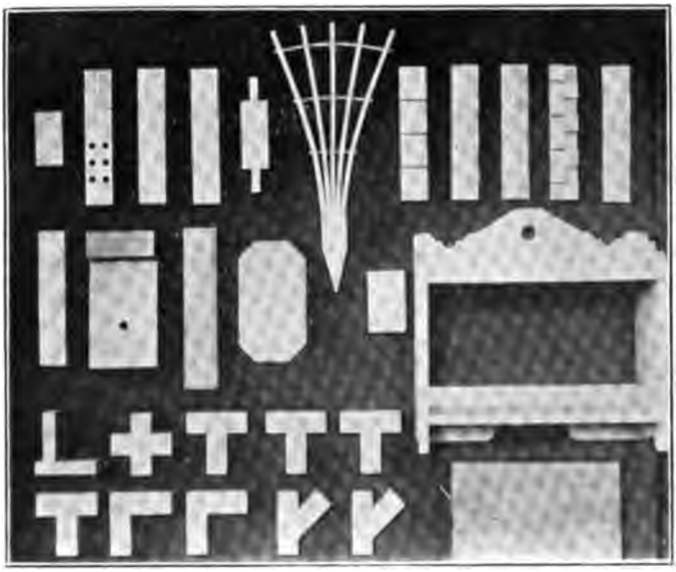
The total number of pupils taking the course in manual training was 50 per cent greater this past year than during the previous year. Most of the pupils have shown great enthusiasm for and interest in their work. Many of them have worked extra hours and accomplished much more than the required amount of work. The number of girls taking the manual training courses is increasing. During the past year there were six girls out of a total enrollment of forty-six pupils Manual training is educational in its aims, and at the present day women desire the same broad education that men have, so the girls should have the same hand, eye and brain training that the boys have.

All of the pupils come to the manual training teacher twice each day, so the total number of pupils taught per day is really ninety-two instead of forty-six.

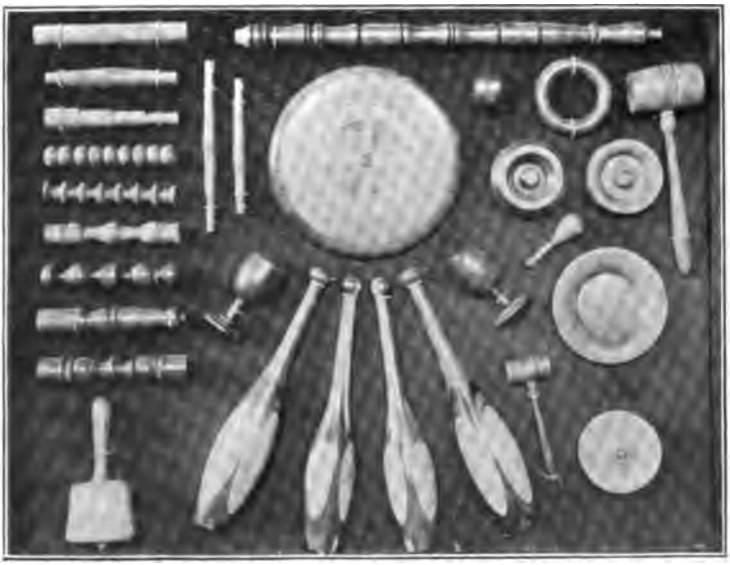
A year ago I was given permission to purchase a small equipment for Sloyd. Sloyd is a name given to a certain form of manual training which is suitable for primary and grammar grades. The past year the Sloyd work has been an experiment, and the conditions were not entirely favorable. Thirty five pupils from Miss Stein's room (the sixth grade of the Franklin school) were divided into two classes, and each class came to the Sloyd room every fourth day. The exercises used were an Americanized form of Swedish Sloyd, and the progress made by the pupils and the results of the work were encouraging. I wish to thank Miss Stein for her hearty co-operation and her efforts to make this experiment a success.

Our annual industrial exhibitions have been successful and a large number of people have attended on both occasions. The pupils were at work in all departments and their finished work was on exhibition.

I earnestly hope that at some time in the near future some arrangement can be made so that metal work can be introduced into the high school. At the present time I think we should give our attention to the introduction of Sloyd into more of the grades. This can be done at a small expense, as we already have a fine equipment. By increasing our equipment a very little, and appointing an assistant to the instructor, a large number of pupils could be given the benefit of this valuable work. The committee of fifteen reported in favor of giving a half day each week to manual training in the seventh and eighth grades. Pupils between the ages of 10 and 14 years *particularly* need the symmetrical development of hand, eye and brain. My high school classes occupy nearly all of my time, but I hope



JOINERY WORK.



TURNING WORK.

MANUAL TRAINING DEPARTMENT, WEST DES MOINES HIGH SCHOOL.

that we will find some way to introduce the Sloyd into more of the grades next year.

In conclusion, I desire to express my thanks to the superintendent and board of education for their wise counsel, hearty co-operation and uniform courtesy in helping me to carry forward this work, so valuable to the young people of our district. Respectfully yours,

A. C. NEWELL,
Instructor.

REPORT OF SUPERINTENDENT COOPER, 1892.

The introduction of manual training and domestic economy into the high school two years ago was looked upon by many as an expensive and doubtful experiment, but the experience of the past two years in this department of the school has given assurance of the complete success of the venture, and I am sure the board must view with increasing satisfaction this feature of our work. The popularity of the work with the pupils taking it is quite marked, and that it tends to attract and to keep pupils in the high school is well established. That the pupils quickly acquire a surprising amount of skill, a visit to the classes or an examination of the products readily reveals.

But these are not all nor the best of the results. It is true that it is a taking thing because it gives the boys and girls a taste of the work of the world. It is true that it gives deftness to the fingers and accuracy to the eye, but it is also true that it trains the judgment, quickens the intelligence, arouses an interest in industrial enterprises, puts into sympathy with labor and kindles an enthusiasm for and gives dignity to what is wrongly esteemed to be common work

Great stress is laid by the instructors in both manual training and domestic economy upon the thought that it is the chief business of their respective departments to inculcate principles and at the same time to give some practice in the application of the principles taught, but that it is not the province of the one to turn out tradesmen, nor of the other to graduate cooks. They rightfully emphasize the educational side of the work, and by so doing more than double the value to the pupil.

The idea, prevalent to some extent, that the object of the manual training department is to teach trades is a mistaken one. Its purpose is to train the mind as well as the hand and the eye. Its lessons and practice are of such a nature that the whole boy, body, intellect and will is exercised and developed, so that the resulting man will be broader and better able to grapple with every day problems, whether he builds bridges, manages a business, keeps books, or preaches sermons. Its value is such, from the disciplinary standpoint, that in a somewhat modified form it suits the girl as well as the boy, and makes her fitter for any duties.

I deem this work so important as an educational factor, and so influential as an attractive feature for the pupils of the lower grades, that I earnestly recommend its extension as soon as provision can be made for carrying on the work successfully.

REPORT OF MR. BUMANN, INSTRUCTOR IN MANUAL TRAINING, 1892.

Mr. H. T. Kincaid, Principal of the High School:

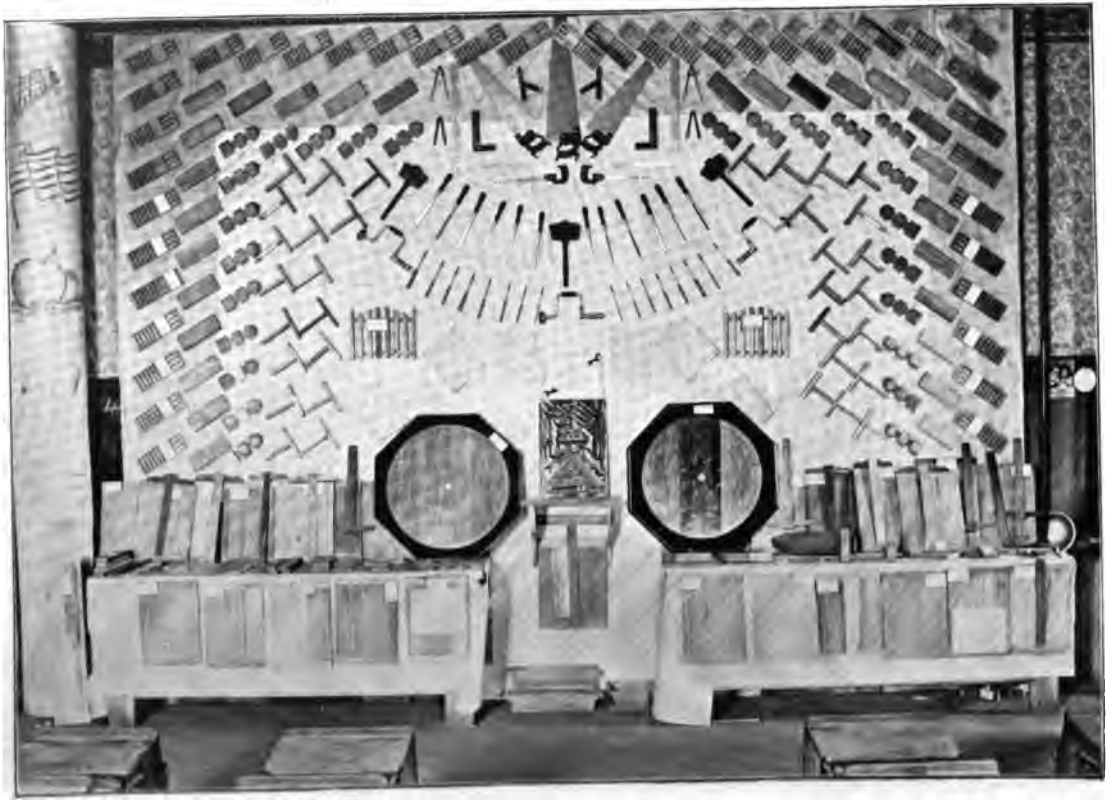
DEAR SIR—I herewith submit a report of the manual training department, and hope that I may have touched upon some point of interest.

The department has been in operation for the past two years, the first year's work being devoted to the joinery and mechanical drawing; the second year's work being wood turning and wood carving, and advanced work in the drawing. To carry on the second year's work it was necessary to put in turning lathes and power, which was done. Twelve lathes and twenty-four sets of turning tools were bought, and the necessary shafting placed in position, but on account of delay in getting lathes to the city the school work was delayed about one month. A fourteen horsepower Edison motor furnishes the power, and has given splendid service, and proven entirely satisfactory and economical. The last term of school should have been devoted to wood carving, but delay in getting tools was again the cause for not beginning work promptly, and although we began a trifle late in both of these departments, fairly good results have been achieved It is to be hoped that if forging, or molding, or any additional work, is to be introduced for the third year's work, that steps will be taken to place additional equipment in position, so that no delay may occur at the opening of school

It is desirable to have the general object of the department understood, and I would suggest that great stress be placed on this fact, that the manual training is given for its educational value alone, and that no trade is taught. It will readily be conceded that the principles underlying a great many trades will furnish abundant material for a course of instruction, and so we claim that manual training has for its object the training of the brain, hand and eye, through the use of tools and the study of drawing This work has a tendency to develop all the faculties, to reach out in all directions, to place the pupils in such position that they are able to make the most of whatever falls in their way. The work also has a tendency to hold the pupils in school, and of the thirty-nine pupils taking the work at the beginning of the year thirty-four remained. The pupils learn to do, by doing, and when the pupils can watch their work grow from the very first to completion it lends an added interest to the work. The consciousness of being able to construct a piece of work, and the working out of some original idea, strengthens their desire to continue in their work, for here they realize that practice can demonstrate theory, and make clear many things otherwise vague and unsettled.

The value of drawing is generally recognized and each pupil is required to make a working drawing before any exercise is begun. Then the pupil has drawing each day, carrying the shop-work and drawing work along together.

The work is not confined to the boys alone, but the girls have the privilege of chosing it. One girl took advantage of the manual training and her work was favorably compared with that of the boys. Many ask why girls should take this work, and the only reply that can be given is, that manual training is given for educational purposes, and the girls are as



MANUAL TRAINING DEPARTMENT, MASON CITY SCHOOLS.

anxious for a broad and liberal education as the boys, and are as able to to apply the principles taught as the boys, in every day life.

The exercises made at school are not supposed to have any value, except for the practice to the pupil. They represent a systematic and progressive course of work, leading up from the simplest joint to a finished piece of work. When the pupil is able to do a piece of work fairly well, he is put on to the next piece. Quality of work is considered before quantity; accuracy before speed; and the principles involved before and above everything else. I may illustrate the manual training by comparison with some other study, such as writing. The copy-book when filled is not a marketable article, and still all can recognize the value it has been to the pupil. They begin by learning to form letters, and with practice, gain speed and accuracy, and when they learn the principles, they are then able to apply their knowledge. The same processes are carried out in our work.

It is hardly necessary for me to dwell on this longer, as the matter will be more thoroughly treated, and I will only add some facts which you would need know as to tools and pupils this year.

First year's work—Mechanical drawing, 45 minutes per day; joinery, 45 minutes per day.

We have nine double benches, and eighteen sets of bench tools to be used by each class as they come to work. We have thirty-six sets of individual tools, so our accommodations for first year's work is really thirty-six, but by buying more individual tools we can increase our accommodations to seventy-two.

Second year's work.—Mechanical drawing, 45 minutes per day, nine months; wood turning, 45 minutes per day, six months; wood carving, 45 minutes per day, three months.

We have twelve wood lathes and eighteen sets of turning tools, a 14-horse-power Edison motor, eighteen sets wood carving tools, thirteen pieces in a set. The benches used in the first year's work were used for the wood carving, so no additional equipment was required.

	Began.	Finished.	Dropped. out.
First year pupils	23	19	4
Second year pupils	16	15	1
Total	39	34	5

It must be remembered that all pupils are handled twice each day by the manual training teacher, making really about seventy-eight pupils each day. The prospects are that larger classes will be formed next year, and that additional teaching force will be required. The first year there were about thirty-six that began the work, and twenty-three remained at the close of the year. Sixteen of those remaining composed the second year's class. In asking those of the second year if they intend to come to school next year, a number answered: "What will we have in manual training?" "Just depends on whether we have advanced manual training" So this is evidence to me that the work is going to hold a great many pupils in school.

The exhibits of work were made in the show window of Mr. Norman Lichty's drug store, and at the school building at the end of the school year. The exhibits have excited many favorable remarks, and have been the means of showing the patrons of the school and the public generally what is being done. Yours truly,

A. M. BUMANN,
Instructor.

REPORT OF MRS. MILLER, INSTRUCTOR IN COOKING, 1892.

Mr. H. T. Kincaid, Principal of the High School:

DEAR SIR—As instructor in the cooking department of the West Des Moines high school, I herewith submit the first biennial report of this branch of our public schools.

This department in connection with manual training work for boys was opened September, 1890, as a part of the high school course.

Sixty-four pupils, making four classes of sixteen each, were enrolled the first year. Applicants from the four classes of the high school were admitted, the greater number being from the freshman class.

To confine the time of recitation to school hours, each class was restricted to one period of forty-five minutes a day, which was found to be too short for most practice lessons in cooking.

The year's work closed with a public exhibition, one room being filled with tables tastefully set and covered with such products of the culinary art as could be creditably exhibited, while in the kitchen classes were at work.

The cooking department is equipped as follows: Four large cooking tables, with heavy maple tops, having a utensil board or cupboard along the middle, upon which are arranged sets of kitchen utensils and dishes. Each table has two gas burners and two portable ovens. Four girls work at each of these tables, two at a side There is also a large cupboard in which to keep the supplies and extra sets of utensils, a refrigerator, a supply table, a kitchen sink, and a No. 9 Acorn range. The pupils keep their aprons, books, towels, etc., in locked drawers in the sides of the tables. This equipment provides for four classes of sixteen pupils each per day.

The recitation begins with a short lecture and demonstration lesson upon which the pupils take notes, and questions are asked and answered The class then take their places at the tables, and each student works out for herself, with test tube and thermometer, the experiments outlined by the instructor. The results of these experiments are recorded in note books, and form the principles upon which the cooking operations are based. Or, if a practical cooking lesson, the preliminary instruction and note taking are followed by the cooking operations performed at the tables, the pupils working in groups of two or four

Recognizing the fact that cooking taught merely as an art has no place in our public schools, instruction in this department has been placed as nearly as possible on an educational and scientific basis.

"Principles, not recipes," is our motto.

Thus taught, cooking is the practical application of physiology, botany, chemistry, and physics, all of which it is desirable should be preparatory to admission to this department, but only the first has, for practical reasons, been made so.

The second year only those above the freshman class were admitted, and the time of recitation was extended from one to two periods.

The adoption of these changes and a misunderstanding among pupils and teachers as to whether cooking would count as a regular study in the high school course, decreased the number of classes from four to two.

The increased efficiency of the work done by the pupils the second year, however, fully justified the changes that had been made.

The following is the course in cooking:

Chemistry of combustion, construction of stoves and ranges, making and care of a fire.

Kitchen Utensils.—How to select those best adapted in size, weight, material and pattern to the purposes for which they are to be used. Use and care of the same.

Water.—Experiments with; using laboratory thermometers to ascertain the simmering and boiling points. Conditions which effect the boiling point. Highest temperature to which water can be raised under ordinary atmospheric pressure. From these experiments numerous and important practical conclusions are drawn.

Food—Classification of; function of the different food principles; hygienic combinations of food substances. Experiments with starch, flour, gluten, albumen, dextrin, etc., from which are deduced the underlying principles of cooking.

Mixing—The manner of, as stirring, beating and folding. The art of making combinations, as in soups, salads, puddings, pies, cakes, sauces, flavorings, and condiments.

Boiling.—Meats, chicken, fish, oysters, etc.

Boiling—Practical illustrations of boiling, steaming and stewing in the cooking of vegetables, cereals, meat, fish, oysters, etc.

Roasting.—Lessons on the roasting of meat and poultry, alternating with one or more on the warming over of cold meats into numerous economical and dainty dishes.

Baking.—Heat and its action on different materials. Chemical and mechanical action of materials used. Manipulations in bread making in its various stages. Yeasts and their substitutes. Experimental work, with soda, cream of tartar, baking powder, etc., from the results of which are deducted the rules which govern the mixing and baking of mixtures containing these substances. Practical experiments in making and baking bread, batter mixtures, pastry, cake, desserts, etc.

Frying.-Chemical and mechanical principles involved and illustrated in the frying of meats, fish, shell fish, vegetables, batter mixtures, etc.

Preparation of food for sick.

Marketing—Economical selection and purchasing of household supplies. The anatomy of animals used as food, the butcher's method of cutting up a carcass of beef, veal, mutton and pork, and how to choose and use the different cuts.

General instruction in systematizing and economizing household work and expenses. Thus, school life shall prepare for home life, and the contents of text-books shall be given a double interest.

Respectfully submitted,

NELLIE RAWSON MILLER,
Instructor.

MANUAL TRAINING IN THE MASON CITY PUBLIC SCHOOLS.

A. R. SALE, SUPERINTENDENT.

The rise and growth of the industrial movement in our public schools is of great interest, not only to the educationalist, but to the student of sociology. It is the blending of the abstract and the actual, the theorist and the mechanic, the school and the shop. It is no sudden whim or fad, but the dawning of a new era. It is the embodiment of the ideas of Rosseau, Bacon, Pestalozzi and Spencer. France, Germany, Belgium, England and the United States have all taken up the idea. It is the carrying out of the principles of the kindergarten in the upper grades. The manual training school and its methods mark the progress of the schools from the days of the stage-coach to the electric motor age. The school is growing to its proper function, that of training and developing for life, rather than instructing in those things that the fathers learned. The day of memory training must give way to the training of *head*, *heart* and *hand*.

The boys and girls must get from the schools that culture which will put them in closest touch with the life of the world. They must be instructed so that not only scientists, artists and professional men shall go forth, but that artisans, mechanics and engineers shall receive their inspiration in the schools. The hand must not only be taught to pen poems, but to shape and form the useful and the beautiful out of crude matter. In what better way can an honest respect for labor of the hands be taught than to make the work of the school partake of the work of the shop, the farm and the mill. The work of the manual training school is not like that of the trade school, for the purpose of training for some particular trade or calling. It is some of the exercises of the trade school incorporated into the curriculum of the school to broaden and harmonize it with the needs and environment of the pupil. A boy or girl who has completed a liberal course in manual training will be better equipped for any vocation. As a lawyer he will make a closer brief; as a physician he will diagnose more accurately; as a preacher he will make clearer and better exegeses; as a farmer he will plan his work to the best advantage; as a merchant his business will be carried on with method and exactness.

This department of our schools was opened in 1890. Classes then worked at irregular periods, in charge of a teacher, who gave three hours each week to the supervision of the work. Since 1894 a special teacher has devoted all his time to this department. Pupils go at regular intervals from the schoolroom. The number who elect this subject has increased from fifteen to 125, including a class of ten young women from the upper grades of the high school. Boys from the seventh to the twelfth grade are admitted. The spirit in which this work is taken up is evidence of its value. Breaches of discipline and order are almost unknown in this department. Every pupil is intent on his work. There is no wasted time here; no idle yawning and lolling, waiting the dismissal time. Teachers of the regular departments say that the boys watch the clock for the "manual training hour." Instead of robbing the regular school work of so much time it seems to rest the boys, for they return to their books with renewed zeal.

It seems to invest the other exercises with renewed interest. Many teachers and parents believe that it keeps the boys in school at that dangerous age when so many want to leave to "get a job." Be this as it may, the records show that the high school has graduated during the past four years seventy-five students, and of this number thirty-nine were young men. The usual percentage is 20 per cent of high school graduates are boys, while our schools show an average of 52 per cent for a period of four years.

COURSE OF STUDY.

The manual training course consists of three years' work in drawing and wood-work.

Every exercise, before it is executed in wood, is accurately represented by a working-drawing, executed by the pupil.

These drawings are orthographic projections, drawn to a scale, inked and properly dimensioned; and as many views are made of the exercise as are necessary to give all of the details. They are drawn either from the models or from blue-prints furnished by the instructor. What is known as the third-angle method of projection is the one used.

After making the drawing the pupil constructs in wood what he has drawn. The work is taken up by "exercises," and is all individual, so that none may have to go faster than he is capable, or slower than is necessary.

FIRST YEAR'S WORK.

The teacher explains:

1. The object of the department; kinds of work pursued; names of tools; care of the tools and all articles pertaining to the work.

2. Names and use of drawing instruments, drawing board, "T" square, etc.

3. Drawing exercises for the purpose of familiarizing pupils with the use of the instruments, as follows: (*a*) Accurate measurement with architect's scale and needle-point; (*b*) Parallel, horizontal and vertical lines, with lead pencil and with ink; (*c*) Neat style of lettering; (*d*) Parallel oblique lines and angles of 90°, 60°, 45° and 30°.

4. *Working drawings:* Their use; importance in the industrial world; the difference between working drawings and pictorial drawing; projection principles; selection and arrangement of views; a thorough understanding of the scale; locating points with a lead pencil; inking; shading; dimensioning.

Wood-work: 1. Marking off and sawing; 2. Sawing diagonally; 3. Boring; 4. Planing without regard to size; 5. Planing to given dimensions; 6. "Getting out stock" for future use; 7. Sawing to a gauge-mark; 8. Mortising; 9. Rounding and beveling; 10. Paring; 11. Boring and mortising; 12. Drawing-board; 13. Square butt joint; 14. Halved splice; 15. Halved right-angle joint; 16. Ledge joint; 17. Small drawer; 18. Single mortise and tenon; 19. Double mortise and tenon; 20. Mortise and tenon frame.

SECOND YEAR'S WORK.

1. Blind mortise and tenon; 2. Tongue and groove splice; 3. "Set in" joint; 4. Right angle dovetail joint; 5. "Set in" and mortise combined; 6. Scarfed splice; 7. Scarfed splice with keys; 8. "Set in" splice; 9. Double-keyed scarfed joint; 10. Truss joint; 11. Brace joint; 12. Common dovetail joint; 13. Ledge dovetail joint; 14. Secret dovetail splice.

THIRD YEAR'S WORK—CONSTRUCTION.

1. Miter box; 2. Mitered frame; 3. Hopper-shaped box; 4. Small gate; 5. Small panel door; 6 Small set of steps; 7. Small chest; 8. Case of pigeon-holes; 9. King post truss; 10. Corner piece with shelves; 11. Small case of drawers; 12. Hard wood blacking case.

Besides the regular drawing work of the course, there is given to pupils of this department a complete course in geometrical and mechanical drawing; also an elementary course in architectural drawing.

CO-OPERATIVE RAILROADING.

The Illinois Central railroad, which crosses the northern portion of the state, has in vogue a system of co-operation which will be of much interest to the many believers of that method of conducting business. A short synopsis of the working of that system is herewith appended:

On the first day of each month the company quotes to employes, through the heads of their departments, a price at which their applications will be accepted for the purchase of Illinois Central shares during that month. An employe is offered the privilege of subscribing for one share at a time, payable by installments in sums of $5 or any multiple of $5, on the completion of which the company will deliver to him a certificate of the share registered in his name on the books of the company. He can then, if he wishes, begin the purchase of another share on the installment plan. The certificate of stock is transferable on the company's books, and entitles the owner to such dividends as may be declared by the board of directors, and to a vote in their election.

Any officer or employe making payments on this plan will be entitled to receive interest on his deposits, at the rate of 4 per cent per annum, during the time he is paying for his share of stock, provided he does not allow twelve consecutive months to elapse without making any payment, at the expiration of which period interest will cease to accrue, and the sum at his credit will be returned to him on his application therefor.

Any officer or employe making payments on the foregoing plan, and for any reason desiring to discontinue them, can have his money returned to him with accrued interest, by making application to the head of the department in which he is employed.

An employe, who has made application for a share of stock on the installment plan, is expected to make the first payment from the first wages which may be due him. Forms are provided for the purpose, on which the subscribing employe authorizes the local treasurer in Chicago, or the local treasurer in New Orleans, or the paymaster or the assistant paymaster to retain from his wages the amount of installment to be credited monthly to the employe for the purchase of a share of stock.

In case an employe leaves the service of the company from any cause, he must then either pay in full for the share for which he has subscribed and receive a certificate therefor, or take his money with the interest which has accrued.

The foregoing does not preclude the purchase of shares of stock for cash. An employe who has not already an outstanding application for a share of stock on the installment plan, which is not fully paid for, can in any given month make application for a share of stock for cash at the price quoted to employes for that month, and he can in the same month, if he so desires, make application for another share on the installment plan.

Employes who want to purchase more than one share at a time for cash, must address the vice-president in Chicago, who will obtain for them from the New York office a price at which the stock can be purchased.

Any employe desiring to purchase stock (except in special purchase of more than one share for cash) must apply to his immediate superior officer, or to one of the local treasurers, or to Mr. M. F. Mogg, traveling agent, whose address is 1 Park Row, Chicago, Ill.

Originally this applied solely to those in the service of the Illinois Central Railroad company. It has since been extended so as to include all those employed on, or in connection with, the Yazoo & Mississippi Valley railroad, operating 807 miles in Tennessee, Mississippi and Louisiana, and the Chesapeake, Ohio & Southwestern railroad and its affiliated corporations, operating some 460 miles in the states of Kentucky and Tennessee.

At this time there are registered on the books of the company as owners of shares, 286 officers and employes who are not directors of the corporation. Most of these hold but one share. In the aggregate they hold 1,816 shares. In addition, 1,485 officers and employes have made partial payments on account of further purchases of one share each.

The system tends to bring the employer and the employes in closer affiliation. It also gives those employed in the service a direct, personal interest in the profits and in the control of the corporation, affords them a safe investment at a fair rate of interest for their savings when deposited in very small sums. This replaces, to a certain extent, the lack of savings banks, which do not exist in the rural districts in the south and west as they do in New York and New England.

To the corporation, the advantage lies in having a resident ownership of stock, and that ownership in the hands of those upon whom it must always rely for the safe and economical despatch of its business.

That the public in the territory served by the railroads named above will benefit by this, goes without saying.

THE TEMPLE AMENDMENT.

At the special session of the General Assembly an amendment to the railroad laws was introduced by Representative Temple of Clarke county. So much interest was manifested in this amendment, and so many persons have asked this office for information concerning it, that as complete a report as it was possible to obtain of the proceedings of the General Assembly and the work in connection therewith is hereby given.

In dealing with this subject it must be understood that no attempt has been made to give coloring to either of the opposing factions. Facts alone are recorded as they transpired, as near as it is possible to obtain them.

That portion of the railroad law that was sought to be amended is as follows:

SECTION 2002 OF M'CLAIN'S CODE—ENACTED BY THE NINTH GENERAL ASSEMBLY.

Every corporation operating a railway shall be liable for all damages sustained by any person, including employes of such corporation, in consequence of the neglect of agents or by the mismanagement of the engineers or other employes thereof, and in consequence of the wilful wrongs, whether of commission or omission, of such agents, engineers or other employes, when such wrongs are in any manner connected with the use and operation of any railway on or about which they shall be employed; and no contract which restricts such liability shall be legal or binding.

The amendment offered by Representative Temple and introduced in the house on the 20th day of February, 1897, is as follows:

TEMPLE AMENDMENT.

Amend section 2002, of McClain's Code, by adding thereto the following: "Nor shall any contract of insurance, relief, benefit or indemnity, in case of injury or death, nor in any other contract entered into prior to the injury, between the person so injured and such corporation or any person or association acting for such corporation, nor the acceptance of any such insurance, relief, benefit or indemnity by the person injured, after the injury, from such corporation, person or association, constitute any bar or defense to any cause of action brought under the provisions of this section."

A motion to adopt the amendment by Mr. Temple was carried unanimously with one exception. It, together with numerous amendments, was then sent to the senate and there referred to the committee on railroads, consisting of Senators Penrose (chairman), Palmer, Young, Garst, Riggen, Berry, Hobart, Phelps, Upton, Bell, Byers, Ranck and Hurst.

Several more or less important meetings of this committee were held upon other amendments of which no attempt has been made to keep authentic records. The two most important meetings of this committee relative to the Temple amendment were held upon the evenings of March 4th and 11th. The minutes of the meeting referred to in the opening address of the chairman of the committee could not be obtained, therefore, no report of that meeting can be given.

Following will be found stenographic reports of those meetings:

MEETING OF THE SENATE RAILROAD COMMITTEE.

(Held at the capitol building, Thursday evening, March 4, 1897.)

Senator Penrose, chairman of the committee, called the meeting to order as follows:

GENTLEMEN—We have called this meeting for the purpose of listening to the employes of railways who favor what is known as the Temple amendment. One week ago to-night we had a meeting at which we heard the opposite side, and to-night we desire to listen to those who favor the Temple amendment. Now, if there are any gentlemen here who are acquainted with the employes of those roads I wish they would either point or call out the gentlemen.

Mr. H. E. Wills, of Clinton, Iowa:

MR. CHAIRMAN AND GENTLEMEN—With your kind permission I would like to say a few words, or rather submit to you a few words which will be in writing, and then I would like to call upon different ones, as we have talked the matter over among ourselves, and would like in our own feeble and disjointed way to tell this committee how we feel about this matter.

CHAIRMAN: Gentlemen, this is Mr. Wills.

MR. WILLS: Gentlemen, I will proceed to read what I have to say on this subject. (Mr. Wills here read a paper as follows.)

We understand that the report is current that we are prompted by a spirit of revenge against the Chicago, Burlington & Quincy in asking that the Temple amendment become a law. We wish to characterize such a report as malicious and false. We simply take the position that an injustice is being done by the carrying out of an ingenious plan whereby a wealthy railroad corporation, by unfair means, gets a portion of the earnings of their employes and uses it to settle claims against themselves, thereby defeating what we believe is acknowledged by fair-minded men to be one of the most just laws on the statute books of our state. We don't deny, but take pride in saying, that we represent a branch of organized labor, and, so that no wrong impressions shall be made, we wish to say a few words in reference to our organizations. I will refer especially to the Brotherhood of Locomotive Engineers, an organization of which I have been a member for a little over a quarter of a century.

In order to show what we think to be almost an ideal condition, I ask your indulgence while I attempt to explain concerning our existence and workings on one of the leading lines in the country.

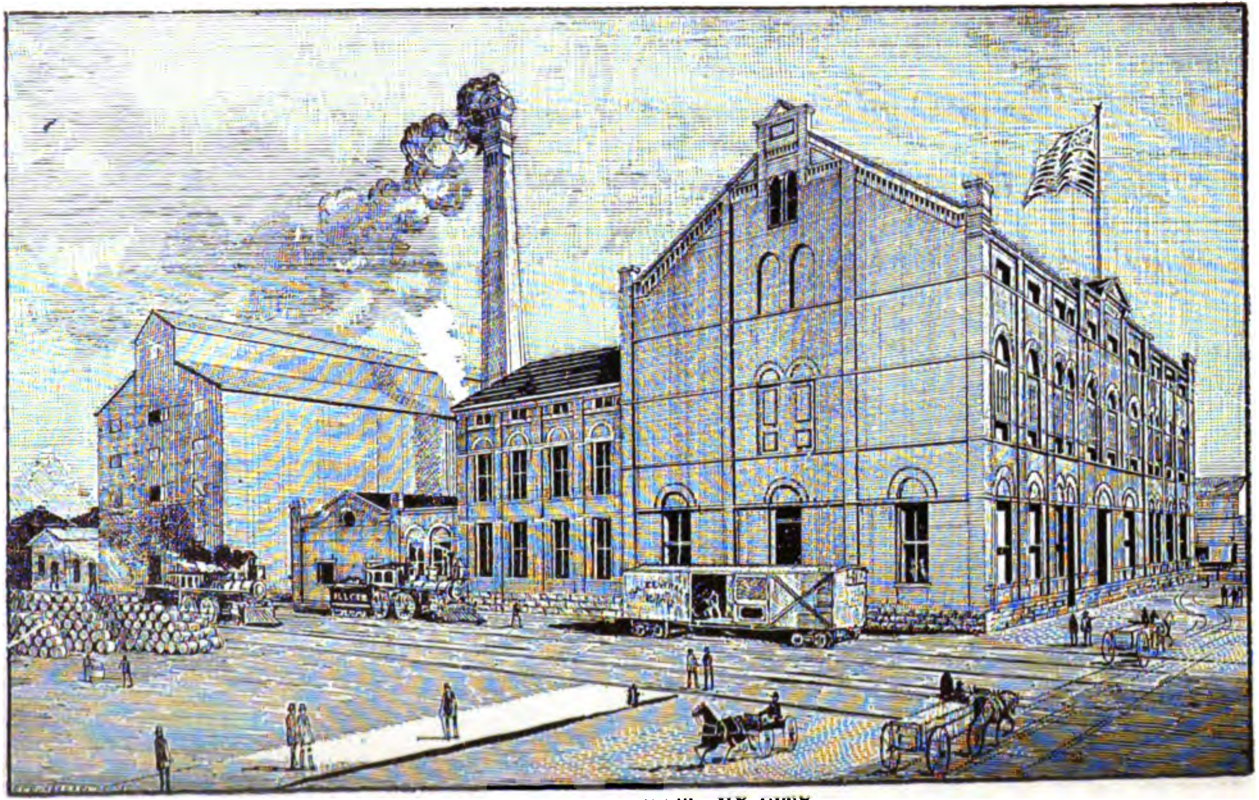
This organization has been in existence on the Chicago & North-Western railway ever since 1865, and has, from time to time, had numerous meetings with its officials through committees representing the men, on almost every subject, from the arranging of a schedule of wages to the adoption of rules governing foremen and master mechanics in the employment and treatment of its engineers; and we have always been able to arrive at conclusions that were mutually satisfactory and agreeable, and, I believe, profitable to both. Yet, with that spirit of frankness that has always been shown by that management toward its engineers, I wish to state that I believe very much is due to that greatest of great railway presidents, Marvin Hughett, and from the general manager to the humblest employe we are taught by his example the principles of equality as well as the brotherhood of man.

Many solutions of the problem of harmonizing capital and labor have been proposed; such as profit sharing, mutual benefit associations, pension funds, joint ownership, federation of labor, strikes, arbitration, government ownership, political combinations, communism of property, and so on, some of them admirable and most of them containing elements of equity and reason. But, after all, no artificial bond of peace between wage-payers and wage-earners has the power and the permanence that results from the existence of genuine respect and affection on the part of the employer toward the employe. It is a rare gift whereby the head of a great establishment, employing hundreds and thousands of workmen, obtains their hearty confidence and loyal esteem; and it is only men of large hearts, abounding in genuine interest and sympathy for all other men, who elicit this spontaneous tribute.

The whole aim of our organization is to educate its members to a higher standard of excellence in their profession, elevate their standing in society, protect their labor and provide for the widows and orphans.

We strive to have our members comply with the laws, and we believe in practicing what we preach. And, as an organization, have constantly endeavored to impress that doctrine upon the minds of our members. We hold that no railway officer is justified in placing any obstacles in the way of his engineers becoming or remaining members of our brotherhood. Its record of thirty-five years is before the country and I feel that I can challenge any man to truthfully name an instance where the organization, through its officers, has ever made an unreasonable or unjust demand upon railway companies. When they were in trouble with other employes who were led by unscrupulous and irresponsible leaders, and every inducement offered us to take advantage of the situation, we remained true to the principles of our brotherhood and loyal to their interests.

We are opposed to strikes and favor the settlement of all differences by arbitration, and, as an organization, have always endeavored to create



LINSEED OIL WORKS, SIOUX CITY.

and maintain harmonious relations between employer and employe and denounce any attempt to antagonize the interests of labor and legitimate capital. We feel that we should ever remember to be mindful of their interests as well as our own, always remembering the fact that might never did and never will make right.

Voluntary associations for the purpose of regulating the wages of their members by combined action are as old as civilization. In the earliest times we find instances of such organizations formed from motives of interest and policy and the better to secure an adequate return for services rendered. There can be no question about their utility Whatever adverse views on the subject may be entertained by interested capitalists, there can be no doubt that the general result of such unions has been, on the whole, conducive to the permanent moral elevation and physical well-being of the laboring classes. The matter has passed beyond the domain of hypothesis or speculation. A thousand arguments designed to prove trades unions illusory and of no practical benefit, are demolished by the simple fact that trades unions are no untried theory, but subsisting and unquestionable facts. Strikes, no doubt, are often mistakes and fail to realize the desired effect, but we must not forget the laboring class, so-called, must, like any other, stand up for their own rights or be content to see their rights trampled under foot and that the strength given to it by organization is its only effectual defense against the else unchecked tyranny of capital, eager for profit and reckless of others' rights. The power developed by organization may be abused, like any other power, but labor is helpless and a prey without it. We hold, therefore, that trades unions and similar compacts, though often abused, have, on the whole, effected great good; that, through their instrumentality, labor is better paid and its rights better served and better understood than otherwise would or could be. Such being the case, the right of co-operation should be upheld, not only in theory but in practice. Its surrender would remove the most powerful instrument in the hands of labor to withstand the exactions of capital. It should be cherished as a natural and legal right, as the sheet anchor of prosperity. Experiense has proved that strikes and lock-outs, which lead to violence and destruction of property, afford no satisfactory relief. Workers cannot afford to resist the law. Neither can they afford to sit idly down and allow wealthy corporations to do the same, when, by so doing, they place a direct tax upon their employes and use the same to defeat the ends of justice. By observing the law, by defending their own interests with knowledge and foresight, by wisdom and prudence in their conduct, honest men create a public opinion which, in the end, is sure to bring justice.

I wish to state it is my honest belief that what I have said of the Brotherhood of Locomotive Engineers and its workings on the Chicago & North-Western railway is substantially true of the engineers', conductors', firemen's and trainmen's organizations and their workings on other roads.

Gentlemen, the war between capital and labor, notwithstanding the fact that it should not be, is nevertheless being waged throughout the length and breadth of our land. I would like to ask you, gentlemen, is it better that organizations advocating the principles advanced and understood by those who have been before the country with a well known history for over a quarter of a century, be encouraged in their ways of dealing on the side of labor, or is it better to discourage intelligent, conservative organization and take the chances on what is almost sure to follow when capital in its greed shall oppress the disorganized, discouraged and downtrodden masses who, under similar conditions, have in the past resolved themselves into anarchy?

We had expected a gentleman to be present who would be able to give some comparative statements, showing why the insurance as conducted by our organizations is more desirable to us and for the benefits received is much cheaper than is conducted by the Chicago, Burlington & Quincy, saying nothing about the fact that we have the right to legislate in our insurance to suit ourselves, and ours is no bar to action for damages. To-day I received information that the gentleman referred to is sick, and we very much regret that he cannot be with us. There are gentlemen, some of whom represent the organizations that I have referred to, who will handle more in detail the subject under discussion.

MR. WILLS: *Mr. Chairman*—I would like to introduce Col. J. F. Kingsbury, who represents the Brotherhood of Locomotive Firemen of Iowa.

CHAIRMAN: *Gentlemen*—I introduce to you Colonel Kingsbury.

(Colonel Kingsbury reads as follows:)

Mr. Chairman, and Members of the Committee on Railroads of the Senate:

GENTLEMEN—The gentleman who has preceded me this evening has endeavored to show you to some extent the advantage of our brotherhoods to the men employed on railroads, and also the relative position of the two insurance associations, namely, insurance as operated by the brotherhoods and that known as the Voluntary Relief association as now in force on the Chicago, Burlington & Quincy railway. It is my purpose to say a few words relative to local insurance as used by individual lodges and divisions of our railroad organizations in the protection of its members in case of sickness or injury. Organizations known as Mutual Relief and Benefit associations are springing up very fast in our respective organizations, where the members by paying a small amount per month are paid a stipulated amount per day or week in case of sickness or injury. While it is a fact that the insurance connected with the different railroad organizations is compulsory, this association is purely and every sense of the word voluntary.

As men in the actual employ of railroads it is our aim and desire to protect our wives and little ones in every way possible, fully realizing the dangers we are constantly subjected to in either being maimed for life or killed outright or injured in such a manner as to be laid up for weeks together, and in doing this we only act the part of all humanity when we claim the right to secure this as cheaply as possible. Therefore we claim that all men should have the right to take out this protection for their families wherever they can get the best for the least money, and not be compelled to sign such articles of agreement as are contained in the regulations of the Burlington Voluntary Relief association, in which the following contract is entered into by the association and the employes of that road:

APPLICATIONS.

Membership in the relief fund shall be based upon an application in the following form:

I,................of..... ....in the county of ....and state of............. now employed by the Chicago, Burlington & Quincy Railroad company as........ ..... the............., do hereby apply for membership in the relief fund of the relief department of said company, and consent and agree to be bound by the regulations of said relief department, which regulations I have read or have had read to me. and by any other regulations of said department hereafter adopted and in force during my membership, and by any agreement now or hereafter made by the said company with any other corporation or corporations now or hereafter associated with it in the administration of their relief departments

I also agree, that the said company, by its proper agents, and in the manner provided in said regulations, shall apply, as a voluntary contribution from any wages earned by me under said employment or from benefits that may hereafter become payable to me, the sum of $.... ...per month, for the purpose of securing the benefits provided in the regulations for a member of the relief fund of the.............class, with........additional death benefit of the first class.

Unless I shall hereafter otherwise designate, in writing, with the approval of the superintendent of the relief department, death benefit shall be payable to my wife (husband), if I am married at the time of my death; or, if I have no wife (husband) living, then to my children collectively, each to be entitled to an equal share, including, as entitled to the parents' share, the issue of any deceased child; or, if there be no children or such issue living, then to. ...., if living; and, if not living, then to my father and mother jointly, or to the survivor; or, if neither be living, then to my next of kin, payment in behalf of such next of kin to be made to my legal representatives; or, if there be no such next of kin, the death benefit shall lapse, and the amount thereof shall remain as a part of the relief fund without claim for the same.

Any funeral or other expenses incident to my death, which shall have been paid by the superintendent of the relief department, in accordance with the regulations, shall be held to be in part payment of the said death benefit, and shall be deducted from the total amount thereof before payment to the person or persons entitled to receive the same.

I also agree, that in consideration of the amounts paid and to be paid by said company for the maintenance of said relief department, and of the guarantee of said company of the payment of said benefits, the acceptance by me of benefits for injury shall operate as a release and satisfaction of all claims against said company and all other companies associated therewith in the administration of their relief departments, for damages arising from or growing out of said injury ; and further, in the event of my death. no part of said death benefit or unpaid disability benefit shall be due or payable unless and until good and sufficient releases shall be delivered to the superintendent of said relief department, of all claims against said relief department, as well as against said company, and all other companies associated therewith as aforesaid arising from or growing out of my death, said releases having been duly executed by all who might legally assert such claims; and further, if any suit shall be brought against said company, or any other company associated therewith as aforesaid, for damages arising from or growing out of injury or death occurring to me, the benefits otherwise payable and all obligations of said relief department and of said company created by my membership in said relief fund, shall thereupon be forfeited without any declaration or other act by said relief department or said company.

I also agree, that this application, upon approval by the superintendent of the relief department, shall make me a member of the relief fund, on and from the date specified in such approval, and constitute a contract between myself and the said company, and that the same shall not be avoided by any change in the character of my service, or locality where rendered, while in the employment of said company, nor by any change in the amounts applicable from my wages to the relief fund, which I may hereafter consent to, and that the agreement that the above named amounts shall be appropriated from my wages shall apply also to any other amounts which I may agree to pay under the provisions of said regulations, by reason of changes made as aforesaid, and shall constitute an appropriation and assignment in advance of such portions of my wages, to the said company in trust, for the relief fund, for the purpose of maintaining my membership therein, which assignment shall have precedence over any other assignment by me of my wages, or of any claim upon them on account of liabilities incurred by me.

I also agree, that my being transferred to the service of any other company associated with said company in the joint operation of their relief departments shall operate to transfer my membership in the relief fund of said company to the relief fund of the company to the service of which I am transferred, and that this application and contract shall thereupon become binding between me and such other company, the same as if originally made by me with such other company.

I certify that I am correct and temperate in my habits; that so far as I am aware I am now in good health, and have no injury or disease, constitutional or otherwise, except as shown on the accompanying statement made by me to the medical examiner, which statement shall constitute a part of this application.

I also agree, that any untrue or fraudulent statement made by me to the medical examiner, or any concealment of facts in this application, or any attempt on my part to defraud or impose upon said relief fund, or my resigning from, or leaving the service of the said company, or my being relieved or discharged therefrom, shall forfeit my membership in the said relief fund, and all benefits, rights or equities arising therefrom, except that such termination of my employment shall not (in the absence of any of the other foregoing causes of forfeiture) deprive me of any benefits to the payment of which I may be entitled by reason of disability beginning before and existing at such termination of my employment, nor of the right to continue my membership in respect of death benefits only, as provided in said regulations.

In the organization of which I have the honor to be a member, namely, the Brotherhood of Locomotive Firemen, we have three different policies of insurance, one for $500, one for $1,000, and one for $1,500. The first costs us about $10 per year, the second about $18 and the third about $24, and we receive the full face of the policy upon death or total disability. And, in connection with the local insurance which I mentioned before, it keeps our families protected to some extent and we have the satisfaction of knowing that it does not act as any bar to recovery for damages in case of injury or death through the negligence of corporations.

Gentlemen, I wish to say right here that we are voicing the organizations of railroad employes of this state when we say that we are heartily in favor of the amendment to section 38, chapter 5, title 10, known as the "Temple amendment," and do most respectfully ask, in the interests of the 28,000 railway men of Iowa which we represent, that you report this amendment to the senate favorably and that you assist us by every honorable means to secure its passage through the senate.

Gentlemen, we come before you knowing full well our inability as orators, but we come as the men actually affected. We ask nothing but what is right in this matter and we believe the railroad employes of this grand state have the ability and brains to manage their own affairs as to what insurance and what amount they wish to take out. It has been said by a certain few that we are trying to break up this insurance on the Chicago, Burlington & Quincy railroad. Gentlemen, we assure you that such is not the intention of this committee. In fact, we do not care how many such societies they maintain, but we do care when such associations try to defeat the very law as laid down in our statute books for our protection. We are not here to fight the railroad corporations of the state. In fact, we stand shoulder to shoulder with them where our interests are identical, but we do believe that if the Chicago, Burlington & Quincy railroad is successful in defeating the law through an association such as is in operation on that road, it is only a question of time when every railroad in the state will adopt the same organization. I believe you can see as well as we do that if it was not a great benefit to that road they would

CLEANING ROOM, GREEN-WHEELER SHOE CO., FT. DODGE.

not put themselves to the trouble they have in trying to defeat the aforesaid amendment.

In conclusion I will say that without any doubt nine-tenths or more of the railway employes of this state are looking to you for relief in this matter

SENATOR CARROLL: *Mr. Chairman*—Will the gentleman permit a question?

CHAIRMAN: Colonel, are you willing to answer him?

COLONEL KINGSBURY: I will try to the best of my ability.

CHAIRMAN: I would like to say to the committee, both of the house and the senate, that we would like to hear questions propounded by them, and if there is any gentleman in the room who desires to ask questions he may feel free to do so.

SENATOR CARROLL: *Mr. Chairman*—One question came to my mind in the beginning of the reading. He spoke of the employes in the Burlington system being compelled to sign this certificate. I would like if the gentleman would give us all the information on that subject he can.

MR. WILLS: If the gentleman will waive his question, I will say that that will be shown further on.

REPRESENTATIVE BRIGHTON: *Mr. Chairman*—I would like to ask what men joined the association. It has been stated that 40 per cent do not belong to the Voluntary Relief association. What does this 40 per cent do? Are they section hands?

COLONEL KINGSBURY: My understanding is that it is the old employes.

REPRESENTATIVE BRIGHTON: You misunderstand my question. I want to get at the fact as to who are expected to join the relief association.

COLONEL KINGSBURY: My understanding is that all employes of the system are supposed to join it.

REPRESENTATIVE BRIGHTON: Are there any reasons why the section hands should join it?

COLONEL KINGSBURY: I don't know how to answer that question. My understanding of it is that it is open to membership to any employe of that system. I am willing to admit, gentlemen, that as far as this relief association is concerned I am not any too well informed on that subject, as we have never had any such thing on our road, and, as I understand, there is only this one particular road that has it in operation.

REPRESENTATIVE BRIGHTON: What road do you run on.

COLONEL KINGSBURY: On the Chicago & North-Western.

REPRESENTATIVE BRIGHTON: *Mr. Chairman*—I would like to ask, and I think these gentlemen here would like to be informed how this beneficiary association of the Burlington road works to the injury of employes on other roads. Now, this organization or department, as they call it, has been in force some eight years, and we have had no such thing as this Temple amendment during that time. Now, has your association been hindered by it, and how have the employes of other roads been affected by this condition of things upon the Burlington system?

MR WILLS: I think if the gentleman will waive the question we will be able to show, or attempt to show, how and why it affects us.

REPRESENTATIVE BRIGHTON: Do you represent a complaining brotherhood of the voluntary relief department of any road? Are you their representative here, or do you speak for those roads and those persons where there is not any voluntary relief department.

COLONEL KINGSBURY: I will say that I represent the entire firemen and locomotive engineers of the state of Iowa. The voluntary relief has no connection whatever with our brotherhood.

REPRESENTATIVE BRIGHTON: And your brotherhood and yourself also have had no personal experience in voluntary relief?

COLONEL KINGSBURY: No, not as far as I am personally concerned, but some of our brotherhoods have had experience with it. However, I will say that if you will just follow up our line of argument, we will endeavor to show you that we are representing just what you are attempting to obtain from me.

REPRESENTATIVE TEMPLE: *Mr. Chairman*—I would like to ask the gentlemen from Jefferson if he is acting as attorney for any party here or as a member of the senate committee.

REPRESENTATIVE BRIGHTON: I wish to say that I am not acting as an attorney for anyone, and that the courtesy of the senate has been extended to any gentleman in the room, and voiced by the distinguished gentlemen who is presiding over this meeting.

SENATOR ROWEN: *Mr. Chairman*—These gentlemen have come before us for the purpose of being heard on their side of this question and I think that they ought to be allowed to proceed without further interruption.

CHAIRMAN: I would say to Senator Rowen that these gentlemen consented to be asked any questions that the gentlemen present here should see fit to ask.

MR. WILLS: *Mr. Chairman and Gentlemen*—I would like to introduce to you Mr. E. O. Haven, who represents the Brotherhood of Railroad Trainmen.

CHAIRMEN: Gentlemen, this is Mr. Haven, who represents the Brotherhood of Railroad Trainmen, and is from Waterloo.

(Mr. Haven here read his paper, as follows:)

DES MOINES, Iowa, March 3, 1897.

We do not come before this honorable body with imperative designs We fully appreciate your ability in your calling, and it the more embarrasses us in our endeavor to bring certain facts of interest and importance not only to yourselves in framing laws by which to govern the masses of the people of this state, but of vital importance to a large portion of your constituents, those belonging to labor organizations in an especially hazardous occupation. I have been delegated to come here to represent the Brotherhood of Railway Trainmen of the state of Iowa My degree of representation is not limited to any one railroad system or locality, but embraces the entire state. The Brotherhood of Railway Trainmen has been established to promote their general welfare and advance their social, moral and intellectual interests; to protect their families by the exercise of systematic benevolence. It is the aim of this organization at all times to establish a good understanding between the members and their employers; to establish mutual confidence and create and maintain harmonious relations. The benefits derived by members of the Brotherhood of Railway Trainmen do not stop on receipt of their insurance benefits. The laws of this brotherhood provide for boards of adjustment of different wrongs and grievances sustained by its members This board or grievance committee provided is the only way or means by which our general masses can come before our general officers and express our wish and arrange a proper adjustment of their differences. It is also one of the means by which we are here to-day to express to you in our humble way the desires and wishes in detail of a large portion of the laboring men of this state and especially those of railroad occupations.

It is not our intention to speak or use any influence that would be detrimental in the least to any benevolent association; but it is impossible for me to conceive any virtue in any organization that would be affected by the Temple amendment. This amendment does not take away the right of a person to make a legal, fair and honorable contract, but it does make a distinction between an insurance policy contract and a contract of release to corporations who are liable by law for damages sustained by any of its employes, or members of the insurance association in case of negligence. It seems to me that this amendment is just and fair, inasmuch as it only strengthens and supports the true virtue of the laws that have already been enacted.

The voluntary relief department is a special department of certain railroad companies' business, and is a scheme whereby the corporations may exact money from their employes to either defray the expenses of the company in case of litigation or settle claims of personal injury, where recovery by law would be greatly in excess of the amount received from the insurance company and would come from the treasury of the corporation. I will endeavor to make plain to this audience that the voluntary relief department is not a department to protect company employes, but is a department to protect the company in case of personal injury to its employes. The relief department has called the entire criticism that I make on itself, by its own unauthenticated statements The relief department is a department of the company's service in the executive charge of a superintendent whose directions in carrying out its regulations are to be complied with, and this superintendent is subject to the control of the president of the corporation

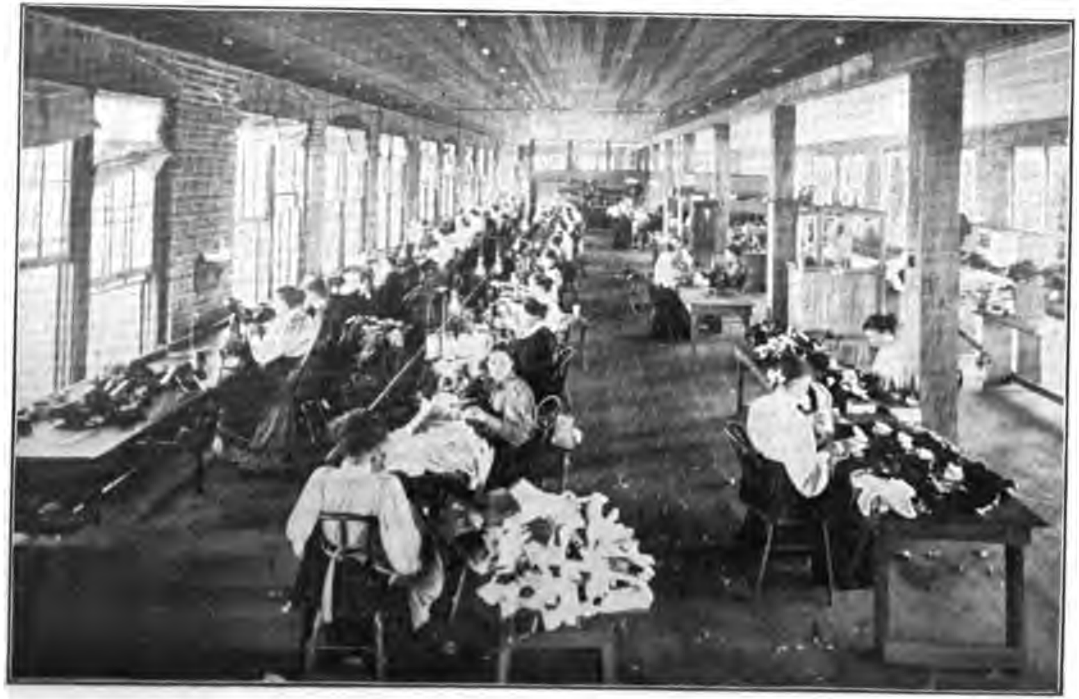
There shall be an assistant superintendent who shall be possessed of all the powers of the superintendent, in his absence, and shall at all times perform such duties as may be assigned to him by the superintendent. There shall be a medical director who shall, subject to the approval and control of the superintendent, appoint medical examiners, assign them to districts, direct their work and have general supervision of the medical and surgical affairs of the department. The medical director may be the same person as the superintendednt or assistant superintendent. The superintendents, assistant superintendents and medical director shall be designated by the president With these provisions, this relief department have an executive and medical staff which are under the entire control of one man, and he, the president of the railroad corporation. There is, aside from this executive staff, an advisory board or committee of the several companies adopting this scheme, consisting of fourteen members, six chosen by the employes and six chosen by the board of directors of the different companies, besides the chairman and secretary or superintendent, making the fourteen members. These figures alone convince me and should convince any man open to conviction, that this entire department is controlled entirely by the corporation and used to defeat the ends of justice to its employes. Our honest, unbiased opinion of the part the employes of this company take on the advisory committee is to vie with each other for favor in the eyes of their superior officers. This is only natural that they should, as they strive in the regular discharge of their duties, to seek advancement by doing well what they do to please the men they are working for.

In continuance of this line, I desire to present to this committee a letter from an employe of this company, the Chicago, Burlington & Quincy, for your consideration. Although the writer has made no request for me not to use this letter or his name, I desire to be prudent in the matter and, for the sake of the writer, I request that his name be kept to the members of this committee. The portion of this letter with regard to this amendment reads as follows:

OTTUMWA, Iowa, March 1, 1897.

E. O. Haven, Des Moines, Iowa:

DEAR SIR—Your letter of the 26th reached me yesterday. In regard to the Temple amendment I will tell you how the majority of us stand. We are surely in favor of it, for no class of men in the states are burdened with such a nuisance as the employes of the Chicago, Burlington & Quincy railroad company are with this relief department. Of course, we are compelled to be a member and pay $2.50 a month and then, in case of



FITTING ROOM, GREEN-WHEELER SHOE CO, FT. DODGE.

an accident, we have to take just what they want to allow us. Our officials here took a very high-handed stand in regard to the Temple amendment. They posted notices calling for a meeting yesterday of all members of the relief department We wasn't supposed to know what the meeting was called for until we got there, but we did. It was talked around and we concluded it would be best to stay away; although the notice read that each and every one make a special effort to be present. So most of us did stay away and worked to keep others away. About twenty-five or thirty of the most timid ones were present and what they did would make a slave hang his head in shame. I will send you clippings of the paper so you can see what was done. The resolutions that were passed were all drafted by the officials beforehand and presented for us to sign. We will write letters, under the seal of our lodge, to our senator and representatives, explaining the situation and telling them how we feel about the matter and what an injustice has been done us. I have talked with several of the boys to-day and every one of them talks the same way. We will surely do all we can for the Temple amendment. Let us hear from you as often as you can.

Yours in B. L.

In making substantial this letter and the few remarks, I present affidavit of R. E. Chambers:

STATE OF IOWA, }
POLK COUNTY. } ss.

In August, 1895, I, R. E. Chambers, approached the trainmaster, Mr. C. W. Hohause, of the B. & M. railway, at Edgar, Neb., and asked for a position as brakeman. Needing men at that time, he presented me with a blank application form to fill out. One of the questions asked in the form was: "Do you wish to join the voluntary relief department?" My answer was: "No." He was watching me fill out this blank form, and when I answered this question in the negative he said, "That won't do." I asked him why, and he replied that any man hiring to this company must join the voluntary relief department.

(Signed) R. E. CHAMBERS.

Subscribed and sworn to.

Also, affidavit of C. F. Steele, which reads as follows:

I, C. F. Steele, sought and received employment on the Burlington & Missouri River railway, at Alliance, Neb., in October, 1891. I joined this relief association in Class 2, that I might receive employment. I was injured at Seneca, Neb, a division point, by being in a caboose there when a train came into the yards and ran into the caboose in which I was, killing one man, injuring myself; there being three men in the car. The third man escaped without injury. My injuries were in the nature of cuts about the head and body and bruises in general, which did not finally result, however, as permanent. I was laid up for a little over thirty days, and was confined to my bed for two weeks. The medical examiner of this division, C. B. McClelland, did not come to me until the third day after this accident. He then placed before me a filled out form which is furnished by this voluntary relief department, and which stated the time in which I would be ready for work, and stipulating the amount of indemnity I would or was entitled to receive, which, in my case, was filled out for three days. I refused to sign or accept this form. He told me that my indemnity and medical aid ceased then and there. I was unable to raise from my bed at this time. The next day I sent for him to call and see me again. He refused, so I continued the services of the doctor who had previously waited on me, at my own expense. Then, a day or so after, I sent for the medical examiner again that I might have a better understanding with him, of the amount of indemnity I would receive. After stating my reasons for sending for him, he accused me of being an imposter and misused me by using abusive language. I took decided exceptions to his statements and cursed him for his abuse, for which I was dismissed from the services of this company and did not receive one cent of indemnity for which I had contributed.

(Signed) C. F. STEELE.

Subscribed and sworn to.

We are in receipt of letters every day from members of this relief department, praying that we will be successful in having this amendment become a law. It is impossible for us to use these letters as the writers request us not to, believing and knowing as they do that it would be taking away their mode of providing a living for themselves and families We know there is an undercurrent of feeling existing among the employes of "Q" road that is being held in check by very conscientious and conservative leaders, and should this feeling be not fully controlled, the disaster caused by the Debs union in 1894 would have repeated itself before this with multiplied disaster and suffering. The president of these United States has the credit of suppressing the revolt referred to, while the greater part of praise is due to the honest, conservative heads or leaders of such organizations as the Brotherhood of Locomotive Engineers, Order of Railway Conductors, Brotherhood of Locomotive Firemen and Brotherhood of Railway Trainmen.

Gentlemen, in consideration of these few remarks, in connection with the letters and affidavits from different employes of the Chicago, Burlington & Quincy system, I am willing for you to judge who is the properly authorized person to express the wishes of the railway trainmen, not only of the "Q" system but of the state of Iowa, in a legislative sense.

I thank you for your attention.

MR. WILLS: *Mr. Chairman*—I would like to introduce to you Mr. William Knight, who represents the Order of Railway Conductors.

CHAIRMAN: Gentlemen, we will listen to Mr. Knight, who represents the Order of Railway Conductors.

(Mr. Knight here read his paper to the committee.)

Mr. Chairman and Gentlemen of the Committee:

It is my desire to speak to you for a few moments from the standpoint of one, who, having by reason of his position in the ranks of organized labor, as an officer in one branch of its service, has been brought into close touch with a considerable per cent of the members of these railway organizations in this as well as in several other states. I desire more particularly to call your attention to certain facts as I know them to exist to-day.

It is conceded by all thinking men in the ranks of these railway orders that although the "strike weapon" may possibly be a good club to hold, it is a very poor one to use, and should never be resorted to until every other means that can be devised to settle our differences with our employers has been tried, and that the day for resorting to strikes to maintain our rights is practically gone by. Especially is this true because of the great army of idle men throughout the country, many of whom, as has been demonstrated in the past, are ever ready to take advantage of such occasions to commit lawlessness and create riotous disturbances.

We fully realize that ours is a *quasi* public service and that our conduct must, at all times, be such as will command the respect and sympathy of the public at large, and while we would not be, in any way, responsible for the lawless acts committed, yet they would certainly be laid to us, and our cause injured in proportion to their extent; therefore, it has been decided that some other means of maintaining those rights and privileges so dear to us all must be adopted. Such being the situation as we see it, where else could we look for relief except to the law-making bodies of our land?

The formation of the legislative board is the outcome of those conclusions. We realize that the time has arrived when we must look to legislation, both state and national, for the redress of the wrongs that may be heaped upon us. Thus, it has been decided by the railway employes, members of the brotherhoods, residents of this state, that they will, like their employers, have some one at the capitol to look after their interests during the sessions of the general assembly. Not only is this true of this and several other states, but there are also kept at the national capitol representatives of these orders to look after our interests in that direction.

It is the general opinion among the laboring men throughout the length and breadth of our land to-day, that matters are getting to such a pass that, while it is a very easy matter for the rich to get laws enacted and courts to decide in their favor, it is getting more and more difficult each year for the laboring classes to get laws enacted—or, if enacted, to have them executed by the courts—that are more directly to their benefit; that combinations of capital, known as trusts and corporations, may violate the laws of the land almost with impunity; while on the other hand, the man with small means, or no means at all, and without political influence, is made to feel the heavy hand of the law for the slightest misdemeanor, and should he forget himself so far as to continue to insist on demanding justice for himself and co-employes after some judge in his infinite wisdom has decided (widely in the interest of the corporation or trust) that he must not do so, he is liable to be thrown into prison for contempt of court—for contempt of the opinion of a man who sets himself up as the prosecutor, judge, jury and everything else that is supposed to go to make up a court of justice in this land of free and equal rights to all

Then again, it is a fact, in the minds of the thinking men in the ranks of organized labor, as well as of many others, there exists a feeling of almost dread of what the future has in store for this great republic of ours. It is a fact that we, who are close enough to these men to hear them express opinions that they would not care to express in public, are ofttimes surprised to hear men whom we have known for years to be very thoughtful and conservative in every way, express murmurings of discontent and opinions that ofttimes verge upon anarchy and treason I assure you, these are in no way the pessimistic creations of my own brain, but are the oft-expressed opinions of the laboring men of this and other states, with whom I have recently come in contact

Now, as regards the matter in the interest of which we have asked your indulgence this evening, I desire to say, first, that I am in no way antagonistic to any relief or other association which may be a benefit to any great number and is an injustice to none, and which is carried on under a liberal construction of the laws of the state. Neither am I in the least particular antagonistic to the best interests of any railway company in this or any other state. I assure you, no one realizes more fully than I do how nearly identical the interests of the railway employes and railway companies are; also, none realize more fully than I do the mistake that has been made by a great many people in the past in thinking that, because our interests are so nearly identical with the interests of our employers, we can have no interest in common with other laboring men, and especially with the agricultural portion of our population. These conclusions are all wrong, and we propose to show to the other laboring men and farmers of this state that we are more broad and liberal, and more independent of the railway company, than they have given us credit for being. We propose to show to all that we are not only going to look after our interests as railway employes, but that we have the interest of all at heart, and will unite in assisting to better the condition of all.

And now, briefly, as to the amendment asked for. The Ninth General Assembly enacted a statute known as "The co-employes liability act." This was intended to protect employes engaged in the extra hazardous occupation of operating our railways, etc., making the companies liable for injuries sustained by an employe, while in the discharge of his duties, and specifically says "that any contract which restricts such liability shall not be legal or binding." This has been declared to be good law and good public policy by some of the highest courts in the land, and the railway companies in this state have never succeeded in shirking that liability until recently, when one of them, taking advantage of the decision of certain courts, which held "that if the company, in any way, contributed to the maintenance of an insurance or relief association, and the employe became a member of such association, and after having been injured, accepted any part of the premium agreed upon in such insurance contract, then he or she could not recover under the statute referred to, for such injury"

This, it seems to us, is allowing the railway companies to not only escape their just liability, but is allowing them to force their employes to contribute to a fund that is to be used by the railway company, to settle for that which the law plainly says they alone shall be liable. If the railway companies desire to operate insurance associations, they should be placed in the same position under the laws of the state as other associations of this kind are placed. It certainly can never be good policy to allow corporations to devise such schemes as this, so that they may not only be able to evade the law, but, as we believe is the purpose, to keep their employes more thoroughly under subjection and render them less independent

This contract of insurance does, according to the decision of our courts, allow the companies to escape their common law liability, and it is from these court decisions that we ask relief. We ask that an amendment be adopted that will cover this particular point, and that will compel the courts to render decisions in accordance with the intent and purpose of the law.

Gentlemen, it has been the boast of the railway employes of this state that we had as good, if not the best, set of laws for the protection of railway employes of any state in the union, and I beg of you, in the name of the 28,000 or 30,000 railway employes of the state, that you report favorably upon this measure, so that not only may justice be done to all, but that it may still be our boast that our laws are second to none and are superior to those of many of our sister states

I do not presume to think that I have presented any new facts to you, but have only tried in my humble way to lay before you the situation as I know it to exist, and in conclusion will only say that in asking you to support the Temple amendment I am only carrying out what I candidly believe to be for the best interest of all our people, and what I know is the earnest desire of my constituents throughout the state.

Gentlemen, I thank you. W. F. KNIGHT,

Chairman Iowa State Legislative Board, Order Railway Conductors.

MR. WILLS: I would next like to introduce to you Mr. Pike, who is one of the brothers that represents the Brotherhood of Railroad Trainmen.

(Mr. Pike was introduced by the chairman and read a paper and extracts from several letters received from employes of the Chicago, Burlington & Quincy railroad addressed to Hon. L. M. Kilburn.)

Mr. Chairman and Gentlemen of the Committee:

The gentlemen who have preceded me have covered the ground very thoroughly and have left nothing of much interest to be said.

We do not wish to appear arbitrary in this matter, neither do we wish to have thrust upon us an insurance which will take from us the rights of freedom and recourse to law which every citizen of this country should enjoy. It has already been explained to you the benefits we derive from our brotherhoods, and they are composed of the best class of men in the employ of the railroads to-day, who do not wish to have some corporation insurance scheme drive them out of existence We have a record of which we are not ashamed and which we will stand by at any and all times. We cannot see where this amendment will affect or prohibit the corporations from continuing their insurance company if they so desire. That being the case, their opposition must be purely a selfish one, and we think it is a direct way of forcing our brotherhoods to suspend business. They claim it is not compulsory, but there have been affidavits submitted to you to the contrary, and we are in receipt of letters daily from the railroad men of Iowa urging us to greater efforts in their behalf, and I must say that a large part of them come from men employed on the Chicago, Burlington & Quincy system, who pledge us to withhold their names for fear of dismissal from the service of the company. And we think from these appeals that we represent a majority of the men on that system, notwithstanding statements to the contrary.

I have a Burlington Hawkeye of March 1st, also an Ottumwa Courier of the same date, in which is an article describing a large meeting held in these two cities, on Sunday afternoon at 2 P. M., in which resolutions were passed favorable to the Burlington relief; and although those two cities are several miles apart the resolutions are identical in wording, showing conclusively that they sprung from the fountain-head of that company. And now, gentlemen, in a spirit of justice toward all and malice toward none, we ask you to make a favorable report on this Temple amendment to your honorable body.

With your indulgence I will read you extracts from some of the letters which we have received:

The men from this place who are in Des Moines, working against you and against the Temple amendment, were sent by the railroad company, so as to make it appear that the employes were there in person to protest against the bill. That is the impression they want to give to the senators and representatives; but there was not an employe knew they were going, so you don't need to think that they represent the employes, for they do not. We pay our money to this relief department in advance and there is no reason why we should be compelled to sign a release to get what we paid for. They call this the Voluntary Relief, but they will not employ any man who does not become a member. I could give you numerous cases where they have abused the insurance.

We want you to go ahead and not be governed by what those men say, as you represent us, and they represent the railroad company, and we insist that you take as much care of the members of the Chicago, Burlington & Quincy as you do those on other lines in the state. Do not let these men fool you as to what the members on the "Q" want, and you may rest assured that your brothers on the "Q" will not only pay their share of your expenses, but will ever praise you for your efforts in their behalf.

In regard to the Temple amendment I will tell you how the majority of us stand. We are surely in favor of it. for no class of men in the state are burdened with such a nuisance as the employes of the Chicago, Burlington & Quincy Railway company are with this relief department. We are compelled to be a member and pay $2.50 per month, and then, in case of accident, we virtually have to take just what they want to allow us. Our officials here took a very high handed stand in regard to this amendment. They posted notices, calling for a meeting of all members of the relief department; we wasn't supposed to know what the meeting was called for until we got there, but we did know, and it was talked around and we concluded it was best to stay away, although the notice read that each and every one make a special effort to be present, and so most of us did stay away and worked to keep others away, but about twenty or thirty of the most timid ones were present, and what they did would make a slave hang his head in shame. The resolutions that were passed were all drafted by the officials beforehand and presented for us to sign. I have talked with quite a number of the boys to-day and every one of them talks the same way. We will surely do all we can for the Temple amendment.

The great majority of the employes on the Chicago, Burlington & Quincy at this place are heartily in favor of the Temple amendment, because they all realize what it is and what benefit it would be to our wives and little ones, but every one is afraid to say a word for it, for our officials between Burlington and Council Bluffs would understand who was working for this amendment and would immediately dismiss us from their service. I have talked to nearly all of the employes here and they are afraid to say that their souls are their own. The company is compelling their employes who belong to the relief department to make sworn affidavit to do all in their power against the Temple amendment. Nearly every man in the service is in favor of this amendment, but they dare not openly express their opinion in its favor, as we are watched constantly by the emissaries of the company, and any language which we might express in favor of it would immediately be reported to our officials.

These, gentlemen, are fair samples of many letters which we have received. I will not encroach further on your time, but thank you for your indulgence

MR. WILLS: *Mr. Chairman*—I would like to introduce to this committee Mr. Hinkson, of Stuart, whom I would be glad to have make a few remarks on this subject.

CHAIRMAN: Gentlemen, Mr. Hinkson.

MR. HINKSON: *Mr. Chairman and Gentlemen*—It might be proper, perhaps, for me to state how I happened to be here on this evening. Some three or four days ago I received a letter from a friend of mine, working on the Chicago, Burlington & Quincy system, an engineer on the railroad there, a copy of a portion of which letter has just been read to you. He requested that I should write to some of our senators and try, in the name of humanity, to help the boys on the system, and I showed it to Mr. Traver, an engineer there who has resigned and gone into business, and told him I had a notion to come down to Des Moines and try and help the men out the best I could, and he suggested that he would come too. We arranged to come on this afternoon train and knew absolutely nothing about the meeting of this committee, had no expectation whatever of being here before you, but I desire to say to you, gentlemen, that I had the letter in my pocket written by this man, a man that I have known since probably 1878. I know him to be an honorable, upright, straightforward man, and a man of more than ordinary intelligence and education among the railroad men; and there is a little bit of it that was not included in that, and if you desire I will read that portion of it, but I wouldn't under any circumstances reveal his name, because he requested it shouldn't be done, and the reading of the letter would plainly disclose the reason why his name should not be divulged. [Here reads letter.] That is the letter that I received, gentlemen, and it was in obedience to that that I came to Des Moines. I know this man and know him so well that I want to say that he is responsible and reliable in my judgment in every way whatever.

MR. WILLS: I want to say, gentlemen, that Mr. Hinkson is mayor-elect of Stuart, and would also say further that this committee, representing the employes, did not know that he would be with us. Mr. Hinkson came to me this evening with two gentlemen that I know to be highly respectable as locomotive engineers and one as a business man of Stuart. I am personally well acquainted with these men and can vouch, if necessary, more than has already been said by Mr. Hinkson.

SENATOR BERRY: *Mr. Chairman*—I would like to ask Mr. Hinkson a question, and before I ask it I want to say for the benefit of the committee that I have known Mr. Hinkson for a great many years and know him to be a man thoroughly reliable. I would like to know how long this man who wrote this letter has been at work on this Chicago, Burlington & Quincy system?

MR. HINKSON: I think he went to work about the time of the strike of locomotive engineers. I don't remember the year, but I think it was at that time he went to work there. He was an engineer of good standing.

Q. Had he run on any other system before that?

A. On the Rock Island.

Q. Did he live at Stuart?

A. Yes, sir.

SENATOR RANCK: *Mr. Chairman*—I would like to inquire if, as his letter says, 99 per cent of the workmen on that system condemn the Burlington Relief department.

A. All I know is he is a prominent man among the engineers and he says, judging from the sentiment there, that is the sentiment of at least 99 per cent. You will notice that is the way he puts it.

MR. WILLS: Mr. Conway has been employed on the "Q" system and came to us because the railroad employes took up a collection that he might come here and through the committee of railroad employes state his case to the railroad committee of the senate. Mr. Conway does not seem to be present. I was informed a minute ago that he was last seen in company with Mr. Hunter, the postmaster.

MR. HUNTER: *Mr. Chairman*—The statement of the gentleman is absolutely correct. When I came in the hall the gentleman came up and looked at me, saying, "I believe I used to know you a few years ago down in the western part of the state." I said, "Very likely; but," I said, "I don't recognize you." He said, "My name is Conway. I was injured at Red Oak some years ago, and," he said, "I used to know you when you was in southwestern Iowa." He said, "I am here for the purpose of attending this hearing." He says, "I was sent here by the engineers at Creston to appear before this committee this evening." Now that is all I know about Mr. Conway. If Mr. Conway is not here some other gentleman will have to explain for his absence.

MR. WILLS: The last I heard of him was as I stated. [Great laughter.]

Mr. Chairman—I would like to state further that Mr. Hunter was heard to tell this man Conway that this railway committee did not meet until to-morrow afternoon at 4 o'clock. Perhaps Mr. Conway will be ready to appear at that time.

MR. HUNTER: I would like to have that statement made again.

MR. WILLS: With your consent, Mr. Chairman.

CHAIRMAN: Certainly.

MR. WILLS: I have been informed that Mr. Hunter was heard to tell Mr. Conway that this railroad committee did not meet until 4 o'clock to-morrow afternoon.

MR. HUNTER: I wish to state that that is absolutely untrue. Mr. Conway said he was here to attend the meeting of this committee to-night. He made that statement to me voluntarily, and I want to say, furthermore, that the statement is as I stated it. He approached me at the door and I didn't recognize the man,

SECTION OF BOTTOMING ROOM, GREEN-WHEELER SHOE CO., FT. DODGE.

and I don't know that I ever saw him before, but he stated that he used to know me; but I didn't make that statement and I would like to know the gentleman that told you that I made the statement.

MR. WILLS: The gentleman is present. He may tell you if he desires to do so.

I would like to call upon Hon. L. S. Huntly.

MR. HUNTLY: *Mr. Chairman*—I hardly know what I am called upon to speak about. I suppose it is in reference to a conversation with a gentleman in regard to some statements — in regard to some facts — I gleaned from some of the employes of the Chicago, Burlington & Quincy last Monday while I was in Chariton. I arrived in Chariton along about 2 o'clock Monday and had not been out of my buggy five minutes until I was stopped on the street by some of the boys, employes of the Chicago, Burlington & Quincy railroad, and they told me about the meeting that was held in Chariton on Sunday and how that meeting was brought about, and I will say that it is just in line with the reports that have been read here to-night. They told me that there was not to exceed a half dozen employes out of 130 that live in Chariton that would endorse the sentiment of that meeting if they did not consider themselves compelled to do so or lose their job. That was the universal expression, and after these boys coming to me I concluded that, for my own benefit, I would look the matter up around among the railroad employes of Chariton, and after talking with those parties for a few minutes I thought I would go up towards the depot, and it is actually a fact that I was two hours in getting one block. I was stopped by the employes of the Chicago, Burlington & Quincy and they detained me for nearly two hours in traveling one block, and I talked with a good many of the employes there that day and they all told me the same story. They said there were not over seven men in Chariton that would not drop their relief association that day if they dared to. These are the facts as the men stated them to me, and I don't know, but I suppose that was all the gentleman wanted me to state.

MR. WILLS: *Mr. Chairman.*—I would like to ask Hon. R. E. Cook, of Red Oak, if he will kindly make a statement of facts of a similar nature.

CHAIRMAN: *Gentlemen*—Mr. Cook, of Red Oak.

MR. COOK: *Gentlemen*—My experience has been somewhat similar to Mr. Huntly's, in the same line, although perhaps not so large as his was. When I got out of my buggy Monday morning after I drove down town I was met by an engineer, and he wanted to know about this business. I explained to him so far as I could the Temple bill, and he stated to me that he was in favor of the amendment and he believed that most of the employes of the company were also; and he says you will get a petition in a day or two with a number of employes' names signed to it, and he says, "My name is signed on it with the rest; but," he says, "I signed this petition because I feared I would lose my employment if I did not sign it." Now, that is practically what some ten or eleven railroad employes of that place told me. After I met these gentlemen, in the course of ten or fifteen minutes I met another engineer that was going down to the postoffice; and the other gentleman having spoken to me as he did, I thought I would ask him and find out what his sentiments were; so I asked him about it. He is an old employe. I should judge he has been in the company's employ ten or twelve years; I have known him six years myself. I saw another employe when I came through, and he is a good man; I consider him in every sense reliable, and he told me practically the same thing—that he believed the majority of the employes were opposed to the "Q" system and were in favor of the Temple amendment. I talked with several others, some of them are freight handlers. Another, in particular, I talked to before I came away was an engineer at the depot. Now, I kind of inferred he might be on the other side, and he called me out to one side and said he wanted to talk to me; and when we got outside he told me practically the same thing the other gentleman told me, only he had one more thing to add: he said that the employes of the company will not be employed unless they go into the Burlington relief. All these gentlemen wished me to withhold their names, and I will have to do it, because they gave the reasonable excuse that they were afraid they would be discharged, and also afraid they would be discharged if they did not go into this relief department. Now, there were ten or twelve only of them in favor of the Burlington relief fund. One was a conductor and one other was a man that works around repairing pumps; those that have easy jobs were in favor of the Burlington relief fund.

MR. LAUDER: You are unprejudiced in this matter, are you, Mr. Cook?

Mr. Cook: I believe that I am. I can't see any reason why I should not be.

Q. You received a petition signed by a number of employes, did you not?

A. Yes, sir; I believe I stated these gentlemen told me I would receive one, and I have a petition with about sixty names on it.

Q. For what purpose was that petition sent to you?

A. That petition was not sent to me, to tell the truth about it. Mr. Long gave me the petition Monday. He didn't tell me what to do with it, but I proposed to deliver that petition to the house when necessary. If you, any of you gentlemen, desire that petition delivered to the house in the morning I will do so, or I will deliver it to the members of this committee. It is a matter of indifference to me, and I do not intend to withhold it at all.

Senator Ranck: I would like to inquire whether the subject matter of this petition pertains to the inquiry here.

A. Yes, sir; it is signed by sixty employes. I didn't count the names, but that is what Mr. Long told us. It is not in favor of the Temple amendment. He is agent for the railroad company—freight agent. He gave me the petition just as I was coming away from there. I didn't ask him anything concerning the relief fund, and he didn't make any statement to me; and I believe I have no prejudice in the matter. The petition, as I said, was against the Temple amendment.

Representative Doubleday: From what you hear those employes say, do you think they signed that petition willingly or do you think they signed it under duress or for fear they might be thrown out of employment?

A. I say these ten gentlemen told me they signed it because they were afraid they would lose it if they didn't sign it.

Mr. Doubleday: Mr. Cook, did those ten men who signed this petition tell you they signed it unwillingly?

A. They told me they signed it, and they were afraid for fear they would lose their places.

Mr. Doubleday: Did any one of those ten men drop a remark that the other men who signed the petition did so for fear they might lose their place?

A. I wish to say that some two or three of these men that spoke to me said that this was nearly the universal feeling of the employes of the company.

Senator Healy: Were you informed who it was that circulated the petition?

A. No, sir; I was not informed that it was circulated. I was informed that the men were called up to the office to sign it.

Q. Up to what office?

A. I don't know whether it was the telegraph office or what office it was; I can't tell you that part of it.

Mr. Huntly: *Mr. Chairman*—I would say that I have a letter from Chariton confirming what I have stated, and if the committee desire it I will leave it with them to examine.

Mr. Cook: *Mr. Chairman*—There is one thing I forgot. Mr. Long says when he handed this petition to me, "I don't suppose this will do you any good because the bill has passed the house." I remember that he stated that.

Mr. Wills: *Mr. Chairman*—I would like to have Mr. Porter, of Centerville, read a letter he has in his possession.

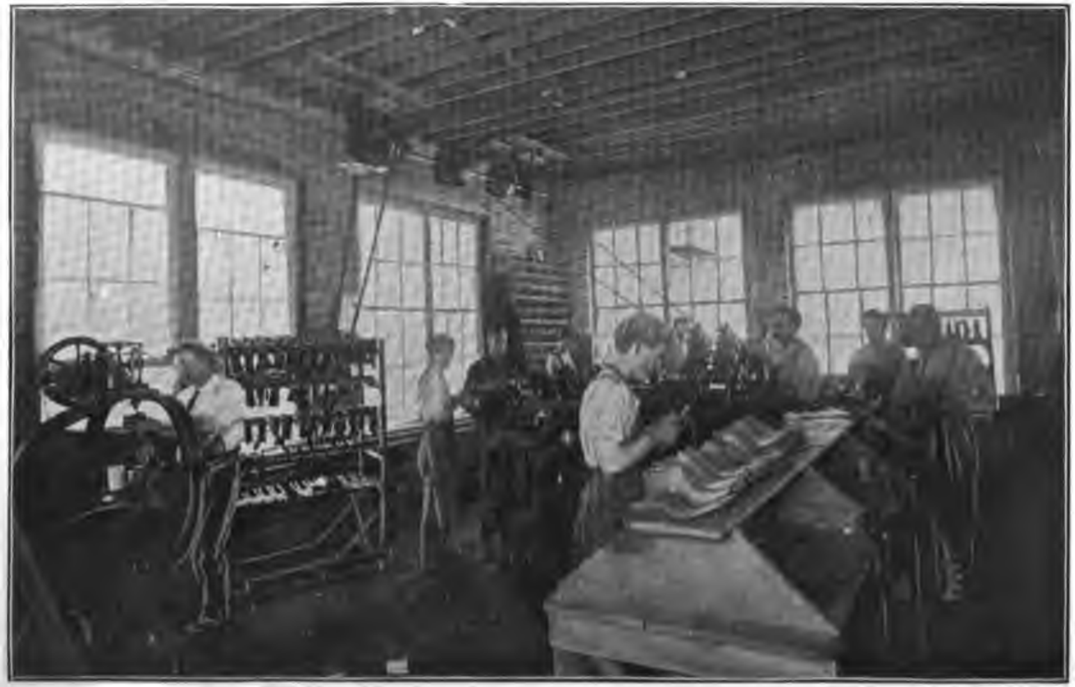
Mr. Porter: *Gentlemen*—There is not much in this letter, more than I received a copy of a resolution purporting to have been passed by railroad men at Moulton, in my county, and having heard these rumors, I wrote to a citizen there asking his opinion, and I will read his letter.

Mr. Wills: I would like to ask Mr. Temple if he will favor us with a few remarks upon this subject at this time.

Senator Ranck: *Mr. Chairman*—I would suggest that we are here to listen to these gentlemen on the facts. We are very much pleased to hear Mr. Temple, but we can hear him at any time on the other side of the house.

Representative Temple: I desire to be excused, because the committee desire to hear the men rather than a discussion of the principles involved in it.

Mr. Ed Corwin: *Mr. Chairman*—There has been a number of things come up here to-night entirely unexpected, and we should like to have an opportunity to set some of these things right. Some of them we are positive, if we can have until next Tuesday night, we can put in entirely a different phase upon it. There have been two or three assertions, particularly, that have been made that are directly aimed at the employes of the road, that I don't believe the employes of the road want to let it stand in that shape, and I think it would be nothing more than fair and just to them to give them an opportunity to show you that at least mistakes have been made.



SECTION OF LASTING DEPARTMENT, GREEN-WHEELER SHOE CO. FT. DODGE

CHAIRMAN: I will say that to-morrow we have a committee meeting and we will lay the matter before the committee and then the committee will decide, if they see fit, and we will let you know to-morrow. I don't want to assume the responsibility of saying now myself, unless the committee shall determine here to-night. I want to say here now that any questions, while we do not want any particular discussion entered into, any questions you are mind to ask these gentlemen are ready to answer.

MR. CORWIN: *Mr. Chairman*—There is one question I would like to ask Colonel Kingsbury. Presuming that the Temple amendment should become a law, what insurance can we give those who are not in any organization, but who are old employes of the Chicago, Burlington & Quincy, we will say from the fact that the relief department is in operation on no other road in the state, are old employes of the Chicago, Burlington & Quincy not members of any other organizations their employment does not give them an opportunity, their age has precluded the possibility of their going into any other insurance. Now, how are you going to provide for such employes?

MR. KINGSBURY: *Mr. Chairman and Gentlemen of the Committee*—I will answer the gentleman's question in this manner. Gentlemen, we believe that the insurance company as now in operation on the Chicago, Burlington & Quincy road works a detriment to our brotherhood. And we also believe that if that insurance company was not in force on that road that these men would be members of our brotherhood, and therefore would be protected by the brotherhood's insurance, and that is why we stand before you to-night, gentlemen, is because of the very fact that this insurance company as in operation on this road, we will admit, has weakened the brotherhood on that system. And why? Simply because the men that labor on those roads are not in position and do not earn the money to keep up three or four different insurance companies. That is the reason, gentlemen, and this, as I believe, we have shown you to-night, is a preponderance of testimony that it is compulsory insurance on that road—this relief business I mean—that you have got to join it and therefore, in general, they have to drop the brotherhood, because they cannot keep up the two, but if they did not exist, in answering the gentlemen's question, they would join the brotherhoods of our different organizations. That is the best of my ability to answer that question.

MR. ED CORWIN: The gentleman has not answered my question. I stated in the beginning that there were a large number of employes of the Burlington road in the relief department who are not eligible to either his or any of the other organizations, and as to the statement that he made with regard to weakening the organizations, I think he is in error there, from the fact that nearly all — I would not commit myself on the per cent — but nearly all the conductors and trainmen of the Burlington system are members of the relief department and members of the organization on that road.

COLONEL KINGSBURY: I would like to ask the gentleman a question.

MR. CORWIN: I will try and answer it.

COLONEL KINGSBURY: I would like to ask you if this Temple amendment becomes a law, whether or not the Chicago, Burlington & Quincy system would not dissolve the relief association as now in force on that road?

A. I think they would.

Q. And for what reason?

A. They would have no benefit; no reason to keep it up.

Q. That is, in other words, the company would have no benefit?

(No response.) [Applause.]

SENATOR BERRY: I would like to ask Mr. Kingsbury a question.

CHAIRMAN: Will Mr. Kingsbury submit to the question?

MR. KINGSBURY: Certainly.

SENATOR BERRY: I would like to ask the same question asked by the gentleman here. If this relief association is dissolved and these men are not eligible to membership in any insurance departments of the brotherhood, how would these old men be provided for?

COLONEL KINGSBURY: Senator Berry, I would just like to ask your indulgence in this question, as I do not pretend to have the experience nor the age as a railroad man that some of my colleagues on this committee, and I want to say to you that I do not understand that there is any bar. If there is, I do not understand it so, and that is the reason why I said that if this insurance company was dissolved, that these men could enter the brotherhood of our different organizations. Now, perhaps our chairman, Mr. Wills, can answer you that question better than we can. I want to tell you, gentlemen, I do not pretend to be an orator or speechmaker, and what I say to you is from the bottom of my heart, and I believe that I voice the sentiments of railroad men in general when I say it, that if this amendment is adopted, that the Chicago, Burlington & Quincy will dissolve; that is, every insurance company they have in operation, and for why? Because there would be no benefit in it to them?

SENATOR BERRY: Then there is another question I want an answer to: Is there any limit as to age or physical condition in the rule regulating admission to the insurance department of your brotherhoods?

COLONEL KINGSBURY: Not that I know of in my individual brotherhood. I can't speak for the rest.

MR. HAVEN: I would like to state, I think 45 years, and also the Burlington has a limit; we have a copy of their rules, but I can't just recollect the age or limit.

SENATOR BERRY: There are a number of us who would like to know definitely from these members of the brotherhoods whether there is any limit to age or physical condition to the insurance departments.

MR. WILLS: There is.

SENATOR BERRY: Now, what would become of these older men of the Chicago, Burlington & Quincy employes too old to join, and in physical condition such that they could not join? Where would they get benefit if the benefit department of the Chicago, Burlington & Quincy is dissolved?

MR. WILLS: I don't think there is any man here that would be able to state where they would be able to get benefit where there is no relief on their roads, but I think it is fair to suppose, if they take the interest they pretend to, they might keep up for the benefit of their old employes.

Q. I want to know what the rules are of your organization. Could they, by joining your organization, get insurance benefits?

A. Over the age of 50, no.

Q. Is 50 the limit?

A. Yes, sir.

Q. And what as to the physical condition?

A. They have to undergo a physical examination.

Q. Then these men, as I understand you, would have to take their chances of being taken care of by the Chicago, Burlington & Quincy?

A. I know of no other way.

MR. CORWIN: *Mr. Chairman*—May I make a statement in regard to it?

CHAIRMAN: Yes, sir.

MR. CORWIN: There is a large number of old men on the Chicago, Burlington & Quincy, members of the voluntary relief department, whose age and physical condition would preclude the idea of their getting into any other insurance on earth.

MR. WILLS: *Mr. Chairman*—I wish to state to Mr. Corwin and also Mr. Berry, and any other gentleman here present, we certainly have no intent to do anything towards injuring the Chicago, Burlington & Quincy relief department. It is not our intent or purpose to injure that or any other statuteable institution. We only ask that the laws that are already in existence may be lived up to and that these plans that have been arranged so as to defy the law there—that the laws may be changed, if necessary, by this amendment so as to prevent that. We have got nothing against the association. We shall not feel that the responsibility is with us if old men are thrown out of insurance. If the conditions are such that that company with their employes have arranged those plans contrary to law, as we believe they have, then let them be responsible who have done that, and not us.

MR. CORWIN: Mr. Wills, can I ask you a question?

MR. WILLS: Yes, sir.

Q. It has been admitted by the gentleman over there that in the event of the Temple amendment passing, it dissolves the voluntary relief and that the men on our road could join your brotherhood. I would like to ask you if you would admit into your brotherhood all of our Chicago, Burlington & Quincy engineers regardless of any further consideration?

A. I do not think the brotherhood would, sir. I am not prepared to say they would not, but I can say to you and the gentlemen here present, with all fairness, that all men on the Chicago, Burlington & Quincy, so far as I know, that come within the limitations of our law, may be admitted into our brotherhood. I know of no reason why they should not be except the influence that is held over them by the management of that road to keep them out.

Q. Would you accept members into your brotherhood that took engineers' places in 1887, at the time of the strike, and are still there?

A. If they are men who are willing to say that they did a wrong by doing that, and are otherwise qualified, we will take them in. If they will say they repent of the wrong we will take them in; have taken them in. We have got many men in our brotherhood that have acknowledged the mistake and have become members, and have all the privileges, rights and benefits that the members of that organization are entitled to.

CHAIRMAN: Gentlemen, are there any further questions?

MR. HUBBARD: *Mr. Chairman*—I would like to ask the gentleman who so ably represented the order of trainmen if he intended to be understood as saying that the Chicago, Burlington & Quincy were benefited whatever in a financial way by the funds paid in by members of that organization? I understood him to say that the Chicago, Burlington & Quincy derived such a benefit as he mentions to pay their expenses of litigation, and I didn't know whether that was claimed or not; whether the Chicago, Burlington & Quincy received any money whatever from the members of the organization which they could, under any circumstances, expend. Perhaps Mr. Wills can answer that.

MR. WILLS: I was listening very attentively, but I would like to ask the gentleman one question before I repeat it.

MR. HUBBARD: Certainly.

MR. WILLS: In what capacity do you come here to ask questions?

MR. HUBBARD: I don't believe that is very essential, but if I must state, I came here in my individual capacity. I have no authority to ask any questions for anybody else. but I was interested in this, being an employe of the North-Western road, as you are interested, being an employe of the North Western and a representative of the trainmen, to say that the Chicago, Burlington & Quincy derived a financial benefit; that is, that they derived money from this relief department with which to pay for the expenses of litigation in suits which were brought against them.

MR. HAVENS: *Mr. Chairman*—I think, perhaps, the question was to me. I will explain as briefly as I can why the Chicago, Burlington & Quincy save money by this, or the statement that I made previously in answer to your question if the Chicago, Burlington & Quincy have an insurance association which sets a limit or a stipulated amount on the price of a man's head, the man signs that contract for that stipulated price and the law arranges or provides a higher price, is that money for the Chicago, Burlington & Quincy or is it money for the employes?

MR. HUBBARD: I don't understand the contract if it is any such as you stated. I don't understand that the contract was one that required a man to sign off his rights to sue the company. I read them very carefully and I have not discovered that. I simply want to know if, when you made that reference, you intended to state that the Chicago, Burlington & Quincy would deviate any funds which were paid in to them into the benefit association for any purpose whatever?

MR. HAVEN: For the benefit of the gentlemen I will state what I have already stated, that this organization is wholly under the control and influence of the president of the Chicago, Burlington & Quincy Railroad company, and all the officers in connection with this are, to an extent, under this control, and I believe—I don't know that it has been done, but I see no reason why it could not be done—if this board of directors and advisory board devote what money they have in their treasury to defray the expenses of litigation. I do not see why that could not be done.

MR. HUBBARD: Do you know of a case where they have done it?

A. I do not. I simply know that under their constitution and by their provisos they might do so.

SENATOR YOUNG: *Mr. Chairman*—I move that the committee do now arise.

CHAIRMAN: Will you hold that motion a minute, Senator?

SENATOR YOUNG: Certainly.

CHAIRMAN: Is there any further question that any other gentleman in the room would like to ask?

MR. WILLS: There is one other gentleman, if Mr. Barnett desires to be heard.

CHAIRMAN: Do you desire to be heard, Mr. Barnett?

MR. BARNETT: I would rather postpone that for to-night.

MR. WILLS: I don't know, Mr. Chairman, as we have anything further in the way of documentary evidence to submit; but before we close, I wish to extend to you and your committee the sincere thanks of the committee that I have the honor to represent of the railroad employes for the very kind and courteous manner in which you have treated us. I also ask a careful consideration of these documents, submitted to you with the understanding that there are certain names to be withheld from the public, and I would like to say that while we realize full well we have not been able to set out our side in a manner such as might be done by gentlemen who have spent their lives studying up these matters instead of being on decks of locomotives and cars, but we ask you to give these matters such consideration so that you can see the line of argument that we present in this, and it will tell you, I believe, what we think, and why we think the injury will follow to us if the Temple amendment do not pass, and we feel if the Temple amendment does pass that no injury should come to any employes in this state. Thanking you again, as far as I am concerned, I am ready to submit the matter to you.

On motion, the committee herein arose.

HEARING ON THE TEMPLE AMENDMENT BEFORE SENATE RAILWAY COMMITTEE, THURSDAY EVENING, MARCH, 11, 1897.

CHAIRMAN: It has been decided that the opponents of the Temple amendment be given one hour, either by the employes of their road or through other representatives, those who favor the Temple amendment one hour, and those who are opposed to the Temple amendment thirty minutes for rebuttal testimony only. No new matter is to be used in the last thirty minutes. There will be no questions asked until the speakers are through, and then only by the senate committee. Now, gentlemen, those who are opposed to the Temple amendment, you may call out whoever you please and occupy this hour as you please

MR. CORWIN: We had understood that the meeting would be conducted a little bit differently and we had prepared an order of exercises that would have extended over a little more time and will have to cut it a little bit short. We will be just as brief as possible I would like, in the first place, to call upon Mr. Guernsey, with your permission.

MR. GUERNSEY: *Mr. Chairman and Gentlemen*—I will not take the time to read the affidavit that is tendered here in response to the affidavit of Mr. Chambers. Mr. Chambers swore that he was asked whether or not he intended to become a member of the relief department. He said that when he responded in the negative he was told he would not be employed. I have here the affidavit of the trainmaster who employed Mr. Chambers, who denies Mr. Chambers' statement, and who says further that Mr.

Chambers' application was in fact accepted and that Mr. Chambers was put on the extra list and that he did not get a job simply because he did not wait until he reached his turn.

The affidavit of Mr. Steele is another of the statements here that refers to specific facts. Mr. Steele said in substance that he was injured on the 17th of October, 1891, and that he was confined to his bed for several weeks, that he was not visited by the relief department physicians, that he cursed those physicians and that he was discharged by the company on account of the abusive language that he used in that connection. I have here the affidavit of Dr. E. E. McClelland, who was the relief physician who attended him, who swears that he attended him three days; who swears instead of being confined to the bed several weeks Mr. Steele was off duty four days; who swears there was controversy and swears Mr. Steele was not discharged. In response to Mr. Steele's claim that he received no compensation, I have here in my hand the check which was issued to Mr. Steele by the relief department for the indemnity for those four days in October, 1891, which shows on its face this amount is in payment of accident benefits from October 17th to 21st inclusive, and which is dated October 30, 1891, which is stamped paid and bears Mr. Steele's endorsement. In response to Mr. Steele's claim that he was discharged in October, 1891, because he resented the abusive language of the relief physician, I have here the voucher for the physician who attended him on account of an injury that he suffered in 1893, I have here the two checks that were issued to Mr. Steele for benefits aggregating about $60 for the injury he received in 1893, eighteen months after he swears he was discharged, which are stamped paid, and which bear Mr. Steele's endorsement on their back. I have here the affidavit of the superintendent with reference to the facts and I have here an autograph letter of Mr. Steele's in which he states that he was discharged, not in October, 1891, but June 8. 1893, for frequenting saloons. That letter will be filed with the committee,

This is the only positive proof that was offered by the representatives on the other side where facts were set out that could be investigated. We believe that this evidence, these checks signed by Mr. Steele and this letter written by him demonstrate that he is a liar.

Mr Corwin: *Mr. Chairman and Gentlemen*—I think you will see readily enough the object in taking up this method which we are going to take in showing the situation. Correspondence has been solicited and only one side has been presented. Questions have been asked the men on the road and when the information replying to those questions was satisfactory to that one side it was presented, the names as a rule not being presented with it. When the evidence is not satisfactory to the other side, we hear nothing of it. It may be possible that they intend to bring it in later on. We intend to show as far as we can and as closely as we can, the policy of the other side. Here is a letter written on a regular letter head which begins, "B. of L. E, O. R. C, B. of L. F, and B of R. T., Iowa State Joint Legislative Committee," and then goes on and gives the full committee in each one of these organizations, under date of Des Moines, February, 25, 1897; to Ed Garrity, Des Moines, Iowa, and signed H. E. Wills, which I will read. [Reads letter *] I don't know what the reply to that letter was but we

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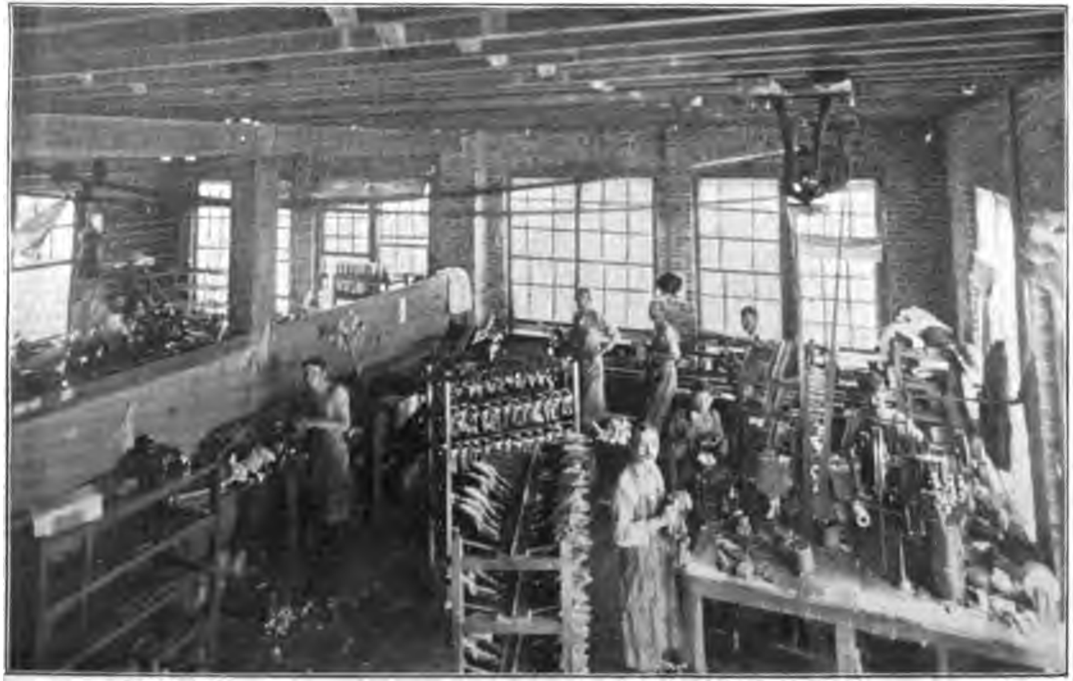
* This letter could not be secured from the Senate railway committee, and hence cannot be reproduced.



SECTION TURN AND WELT DEPARTMENT, GREEN-WHEELER SHOE CO., FT. DODGE.

have some letters to which we have the replies, or copies of replies. Here is one under date of February 25th, on the same letter head, over the same signature, to Charles Boggs. I think it will be taking up time unnecessarily to read it as I have read the one letter, and the others are almost reproductions of that, and unless you think it necessary I will simply read the reply to this letter. The reply to this letter would really be a reply to the other one, the names being changed. It is dated Des Moines, Iowa, March 3, 1897, addressed to M.: H. E. Wills, Des Moines, Iowa, and is as follows: [Reads letter.*]

Here is another to Mr. Joe Noels, who was addressed at Burlington, but belongs at Creston, and the letter being forwarded, reached him March 6, 1897. This is almost identically the same thing and I guess perhaps it is just as well to do as I did with the other, and read the reply only. I will say with regard to that, we have the permission of Mr. Noels in the form of a message received from him to use this. Mr. Noels says: "I have no objection to your showing the letters to the senate committee. We should be frank and open about these matters. J. J. Noels." Here is his reply, dated Creston, Iowa, March 10th, and addressed to H. E. Wills, Des Moines, Iowa. [Reads letter.*]

These letters are referred to with the hope of clearing up that anonymous matter that came up the other night, doing away at least with a portion of the effect of it. It is pretty hard to fight a man in the dark when you don't know who he is or where he is.

Here is another thing that seems to me is worthy of a good deal of consideration from all. I will read it and allow you to decide yourselves It is dated Des Moines, Iowa, March 9, 1897, and is from a man who is representing insurance which presumably would be right against us, and also from a man who is a good judge of insurance. [Reads letter.*] He says if an employe of the Chicago, Burlington & Quincy wants to take insurance in the Pacific Mutual an arrangement can be made by which his payments can extend over a period of several months and the railway company, on an order given for that purpose, deducts the amount from the employe's pay and pays it over to the Pacific Mutual company. He says that the Chicago, Burlington & Quincy officials do not object to that.

Here is a large bundle of affidavits. There are two or three that I want to read to you because I think there is a good deal in them, and the balance we are going to let you do with just as you see fit. The first one is dated Des Moines, Iowa, March 6, 1897, and is as follows: [Reads affidavit.*] It is signed George Hatton. Gentlemen, you can see his name there, and you can find him.

Here is another even stronger than that, and is signed by C. H. Younker. [Reads affidavit.*]

Here is a man who has been employed since 1890. He became a member of the Burlington Voluntary Relief department last year. That man's name is Cozelle. He became a member not by compulsion, but by his own free will. It is in the form of an affidavit. And I am going to leave it with you folks, and you can read it yourselves or show it to others and let them take his name and find out whether he exists or not.

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* These letters and affidavits could not be secured from the Senate railway committee, and cannot be reproduced.

Here is another man who has been in the employ of the company since April, 1883, who says he has never been asked or approached in any way as to joining the Burlington Voluntary Relief company, and it has not affected his standing with the company. This is signed O. E. Slater. Here is another man who has been in the employ of the road a year, never has been in the relief department, and he does not feel that he is injured in any way. That is J. Phil. Ulrich. Frank J. Auger is not a member of the relief department. He is to be found at Des Moines, Iowa, employed in the mechanical department.

Here are the affidavits of Joseph H. Rogers and J. W. Brown, of Des Moines. Iowa, which I will leave with you.

Here is another point which is a little divergent from what we started in with, but it shows you the condition of the men's minds along the line of the road that we inquired about the other night, as to what we could do with them, feeling possibly this Temple bill might become a law and the relief department go out of existence in Iowa. We heard of this to-day, and wired to Chicago for the letter to be wired back. I make that explanation so you will understand why it is the copies appear in the shape they do. There is, in the first place, the message asking for the letter, and the letter wired back, and we have had it typewritten, so it can be easily handled. It is dated 2:22 P. M., Chicago, 3-11, addressed to J. M. Redfern, and is as follows: [Reads letter.*]

In order that you may understand the situation exactly, I will say that this old man, Mr. McFarland, is 66 years of age. He has been employed in the West Burlington shops a good many years. When the force was cut down on account of slack times in this state Mr. McFarland unfortunately happened to be one of the number. The reply to that letter is here. [Reads letter.*] Present age 66 years—can you wonder that he feels anxious about his insurance? Under circumstances of that kind, where there is a possibility of a member becoming delinquent, it is the custom of the department to send them out, a short time before, a postal card notifying them of the limit and that the limit has almost expired. That is only one among a great many just as serious or perhaps more serious cases That old man is anxious.

Here are some more affidavits. These came from Chariton. You can go right there and find these folks if you want to As they do not differ very much from the ordinary run of affidavits, and the time being short, I am simply going to put them in among the other papers and let you do with them as you see fit.

It has been charged that there were some meetings held along the line of the road to draw up resolutions, and these meetings, according to the charges, were held under the supervision of some sort of work boss, men who used a club if necessary, etc I think this will disprove that. I know the men personally who are making affidavit here. These are all in the form of affidavits. [Reads affidavits of W. A. Badger, W. S. Cozelle and W. L. Dykes *]

There is a good deal more of that which goes on the same line, a number of other good affidavits in there, good strong ones, and you can do as you see fit with them. I guess we will drop the balance of these and turn them right over to you folks. I would like to have Mr. Guernsey, with your permission, make some remarks on coercion.

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MR. GUERNSEY: *Mr. Chairman and Gentlemen*—There is one other matter besides the matter that has been suggested by Mr. Corwin that was called to my mind by a senator here this evening, who told me that an employe of the company, with whom I am not acquainted, had requested that special attention be called to the life insurance feature of this matter and to the effect that would be produced if that part of it were abolished, and I want, in response to that request, to say a word before I take up this other matter.

I have a list which shows the number of men who are 45 years of age or over and who on that account would be practically unable to obtain insurance anywhere else. This statement, however, does not include the men who are on what is known as the "K" line—St. Louis, Keokuk & North-Western, I believe is the name of it, Chicago, Burlington & Kansas City, or the Kansas City, St. Joe & Council Bluffs, but includes only the men on the Iowa division—that is, the eastern and western Iowa division There are on those divisions in the relief 2,054 men. Of these men 343 are 45 years of age or over I believe it is fair to assume that an equal number of men would, on account of inability to pass a physical examination, be unable to enter any ordinary insurance organization These men, as evidenced by the letters that have been presented here, feel deeply upon the question as to what is to become of them if this amendment shall become a law. There has been no solution offered of this problem. These men are men who are especially dependent upon this institution because they have not the option of taking this or something else. They can take only what they have. They can keep only what they have. In their behalf I wish to ask your careful consideration of this matter.

I have been requested by the men here to say a few words upon this question of coercion. We are at this disadvantage on this proposition: we are asked to prove a negative, which is always difficult. Moreover, any proof that we may offer is met by the suggestion that that is not a voluntary statement, that it is coerced. These are the difficulties that we are met with in connection with this matter. We have already disposed of the only direct evidence that was introduced here at the hearing a week ago to-night, where the facts were pointed out so that we could investigate. The other matters we cannot investigate. I wish to call your attention to some things that I think are material and are substantially conclusive in connection with this matter. In the first place I want to call attention to what appears from the showing already made here with reference to the statement on the other side. It appears that the representatives of the other side of this controversy have endeavored to do what they charge us with doing—namely, to manufacture a sentiment here, and that then they have come before you and have not presented to you the results of that investigation. We do not know how many more letters they received of the character of the letters which have been presented here, and which, because they were adverse to them, were not presented to the committee. We do not know how many more letters they have sent out. We know nothing about it. But we do know this, that they have not presented to this committee the facts as they found them by their own investigation. A half truth is more dangerous than a falsehood. We do not contend that there are not a half dozen men on the Burlington system who for some reason or other are not entirely satisfied with this relief. I do not apprehend that any man has ever yet devised a plan that will be satisfactory to everybody. I think this legislature has had some difficulty along that line in its work of codification and found that it is difficult to devise something that is satisfactory to everybody. Our contention is that there is a substantially unanimous feeling among the men that this institution is an excellent institution, and the best institution of its kind that is offered to them.

Now, then, what is there in the inherent character of the claim that is made here that these men are coerced which tends to show that the claim is improbable. There are a good many things. In the first place, the railroad men are given credit for having more than the average amount of intelligence. If we should come here and tell this committee that we were coercing these men into doing something that was for their benefit, that is improbable. What men are coerced into doing is something you would not expect they would want to do. There is another thing. This system has been in operation for eight years There have been periodical sessions of this legislature in the meantime. These men, it is said to you, are now voluntarily writing letters. If this is a voluntary expression of the opinion of these men on the Burlington road, if that is what it means, how does it happen that they never discovered they were coerced before now. There is another significant thing. How does it happen that these men never expressed their disapproval of this thing, if they have expressed it, until the most opportune time to assist in the objects of these other men who claim to be here for an entirely disinterested purpose. Isn't it strange if this coercion exists and has existed during this period, that it should never have found expression until the letters of Mr. Wills were going out? You would say that was a little remarkable as a coincidence. There is another thing. If those men are coerced, and there are over 2,000 of them in the state of Iowa, is it not remarkable that not one of them has been found up to this time who will come out and stand up and be counted and say so? I think that the hearing we have had has satisfied this committee that railroad men are not afraid to ask for what they want. And isn't it strange that out of 2,000 men who are being intimidated, who are being coerced, who are slaves, who say that they blush for their manhood, there is not one man that will stand up and say, "My name is John Smith and I am against this." Did you ever know of a parallel case? I don't believe anybody ever did. There is another thing. You have heard of men being coerced and of standing silent, but did you ever hear of a crowd of railroad men going out and earnestly, apparently honestly, vigorously and persistently betraying their fellows. That is what these men like Mr. Corwin are charged with. That is what every one of these 300 men who have sent affidavits are charged with. I would like to have my friends point to a parallel case. These are some of the things that tend to show, in the very nature of things, that this coercion did not exist.

There is another thing that I think is significant. That is this, these men come here and they say to you they are maintaining this lobby from purely disinterested motives. That would be refreshing for you here to see one. I don't believe you see them around very often. I get pay for work I do. I don't pretend I am disinterested. I do pretend I don't tell you any lies. I don't tell you I am here disinterested, I tell you who I represent. If their motive that they allege here is their true motive it is the end of this controversy because we have absolutely demonstrated that this contract is a fair contract, and if that is all they are afraid of they are laboring under a mistake of fact.

Now let me say a word with reference to compulsion. It is said men are compelled to join this department. I believe Senator Berry has been furnished with a statement that shows the exact condition with reference to the men here in Des Moines — I believe many of them are here this evening, in fact almost all of them. I know three of them; I don't know the others by sight, I believe, except the telegraph operator whose name I don't know. These men are half of them members of the department and half of them are not. I have a statement here of the total number of men employed on the Iowa divisions last year. On the east Iowa division 302 men were employed, not including men who were employed temporarily, and of those men 67 have joined the relief. That is verified by an affidavit I have in my pocket. On the west Iowa division there were employed, in 1896, 214, not including those for temporary employment, and but 92 joined the relief. Now these are facts. There have been 87 men in Iowa who have withdrawn from the department since its organization. Of these men 47 are still in the employ of the road. That shows whether they are discharged or not if they withdraw. Another thing that shows whether it is compulsory or not is the fact that these men take more insurance than the minimum amount. I have a statement showing the amounts. These are facts. It is hard to get facts to meet a charge of the kind that has been made here, but these are facts that cannot be changed, cannot be manufactured. So far as we are able to get facts the statements that we make here are corroborated, and the statements of the gentlemen on the other side are refuted.

Gentlemen, I thank you for your attention.

CHAIRMAN: Whoever has charge for the friends of the amendment will now take up the hour allotted to them.

MR. WILLS: *Mr. Chairman and Gentlemen*—I want to state that it had been my understanding until about an hour and fifteen minutes ago, that this meeting was to be exclusively for railway employes; no others would be admitted. We made no preparation of any kind because we did not know as we were going to be allowed to present our side of the case this evening, so we are unprepared. I wish to compliment Mr. Corwin and his able assistants for the very commendable manner in which they present their case, considering the facilities which they have for presenting documentary evidence.

I wish to say as far as the gentlemen who made the affidavits we presented here are concerned, I believe it was stated then, if not I will state it now, were men who were entire strangers to us. They came up and made their sworn affidavits and we presented them to you for what they were worth. I would say as far as letters are concerned that were written over my signature, if there is anything wrong in that, I plead guilty. I wrote eight such letters to gentlemen whose names were submitted to me. I will say I received two answers and I wish I had them here. If I can find them

I will take pleasure in presenting them to the committee for their consideration. I will say out of eight letters I think I wrote, I received three replies. Two of them have been shown here. I will state I have received replies to other letters where they told me, as I asked them, if they did not want me to make the letters public I would not do so. Consequently I am unable to do so. I would like to ask, Mr. Chairman, if it is true you personally invited a number of Chicago, Burlington & Quincy employes to be here this evening?

CHAIRMAN: I will state I selected six, I believe, out of a list of names who were to be present and make statements if they desired.

MR. WILLS: I would like to ask Mr. Corwin, or the counsel for the Chicago, Burlington & Quincy, whom I supposed until a few minutes before we started, would not be here to entertain us, if it is not true that there is in the book of rules covering the relief association, a clause that says the company will be responsible for the contracts made, and, if so, I would like to ask if the Temple amendment would pass, if those contracts would not still remain good for those men who have been members all these long years, and if they could not still remain members of that relief association, if the company carried out its part of the contract?

There are one or two gentlemen here, I believe, that we would like to hear from for a few moments, and I will call upon Mr. Stuart, who, I believe, is not a stranger to you all, but is known here among you.

MR. STUART: I shall occupy but a very few moments. My purpose was to listen to the other gentlemen. I did not expect to be called on myself. I have been somewhat struck with the showing that has been made here this evening, and it occurred to me that if right and wrong are governed in human affairs and in the administration of quasi-public affairs, that this insurance business connected with the Chicago, Burlington & Quincy road is such an excellent institution for the men of that system, that it is such a grand scheme and project, that this honorable senate committee ought to adjourn this meeting and go to a room and form a bill to compel all other railroad companies to adopt the same provision. If it is so good a thing I don't see why the other roads are not compelled to use it.

I had not investigated this subject very much until it was forced on my attention. I did not know until a few weeks ago that there were any members of the Voluntary Relief association in Chariton. I want to say to this honorable committee that this matter has been forced on the attention of the people in Chariton, the business men in Chariton, by the acts of the officials of that road, very respectable and very high minded gentlemen. Instead of the employes themselves agitating this subject, this subject was brought to the attention of the people of Chariton by the officials of the Chicago, Burlington & Quincy road, who came to our town Sunday, calling the men together by a very emphatic notice, as related to me by a number of employes, and if anyone doubts my statement, I stand here ready to take an oath here to-night from anyone having authority to administer it. This matter has been brought to our attention by the officials of the Chicago, Burlington & Quincy road in bringing men together to send resolutions up to your honorable body for the purpose, as we think, of making you believe that the railroad employes of the Chicago, Burlington & Quincy are all opposed to this Temple amendment. That is what is agitating Chariton. It has not been the men; it has not been the employes themselves. I doubt if those who have taken an interest in this matter in Chariton would ever have said a word in favor of the passage of this bill had it not been that the initiative was taken by the railroad men bringing their men together and passing these resolutions.

Now, gentlemen, we are presented with some very strange evidence to-night One affidavit was to the effect that the Chicago, Burlington & Quincy Railroad company actually allowed insurance agents to solicit insurance among its employes. That is a great concession by the company. Affidavits have been produced to show this is a voluntary concern. Suppose that 2 000 men on that system do belong to it voluntarily—suppose that a majority of them do, which we do not for one moment concede; suppose that were true—but if there is one man, one employe of that system, who is coerced, or who has been attempted to be coerced, then the principle is at stake, gentlemen, that deserves your immediate attention. It is not a question whether all men are coerced, but whether one or ten or twenty or fifty. If a system is in effect on that road that coerces men into taking and paying for insurance which they do not care to be connected with, it is a system that needs your attention, according to my way of thinking. Let me tell you in all candor that I have talked to numerous men in Chariton, or rather they have talked to me I didn't know the Temple amendment was before the Iowa legislature; I had paid no attention to the subject. These men came to the business men of Chariton themselves and brought our attention to the subject, and since then numerous ones have talked to me; and it is the general impression in Chariton, and you will have presented to you the affidavit of ninety-two leading representative business men of the city of Chariton, saying that nine-tenths of the railroad men in that section of the road are opposed to this system and opposed to the manner in which it is conducted. The men have called our attention to it, and the mere statement of the fact ought to convince any reasonable man that the business men of Chariton would not come out and oppose the Chicago, Burlington & Quincy road's policy, and also the policy of the men, for they would only lose the trade of both classes, and the company in Chariton is quite a patron of business houses. Let me call your attention to the fact that the business men of Chariton would not make these statements unless they believed they were telling the truth, and that every word they were stating was true.

I have been informed this afternoon that a very eminent railroad attorney in Chariton has written a certain letter. He has been a railroad attorney for thirty years, and he is a very good one. I think he is a nice man, but he looks at one side of this case alone. He has never looked at any other side but the railroad side. That is the trouble with a great many of our friends. But I don't think I ought to consume much time here

The distinguished gentlemen who addressed you in behalf of the railroad company or association has said he would like to hear from some one man who objected to this system, some one employe. I think such a man will probably speak here to-night. Let me tell you, gentlemen of the committee, the way I view this matter. If you endorse a system that, in its effect and workings, compels men to join an association and surrender their common law rights, to recover for damages for the loss of an arm or leg, you are making a great mistake. They may claim all they please that these men are not coerced. I know as well as I know any fact of which I am not the personal subject, I know as well as I know any truth, that a very large percentage of the employes of the Chicago, Burlington & Quincy in and about Chariton feel that it is by very far the best that they should join the association to-day. We grant you that when this organization was first formed they did not compel all the men to go into it. We grant you, the first year they did not compel it, nor the second year, nor the fourth, nor the fifth, nor the sixth, nor seventh, but they kept getting more and more in all the time and now they have got to the eighth year, and when work is begun a man is given to understand, as you know railroads can do inferentially, that they had better belong to the association if they expect to get advancement with the Chicago, Burlington & Quincy. I doubt not there are men sitting in this room to-night who in their hearts are opposed to this system but dare not say what they think in the premises. There were some 300 messages went out of this town yesterday afternoon, saying to this effect, a letter went to you by such and such a mail, be sure to get it and read it. I want to ask you who paid for all these telegrams?

Gentlemen, I say to you, that any system that says to American manhood you must submit to certain terms before you can earn bread according to the Bible injunction, any system that undertakes to enforce such a doctrine on American manhood before it is given the privilege of earning bread, is a bad system.

Mr. Wills: *Mr. Chairman*—I would like to call upon a Chicago, Burlington & Quincy engineer, Mr. Drake, for a few remarks:

Mr. Drake: *Mr. Chairman and Gentlemen of the Committee*—I am a common laborer, an engineer on the Chicago, Burlington & Quincy, and you will find I am a very common talker. I am sorry that Captain Huntley was not permitted to see the affidavits that have been presented here, trying to refute what he said here at the last meeting. I wish to say right here that if I were one of the best speakers in the state of Iowa I could not express the gratitude which the people of Chariton feel for our representative, Captain Huntley.

I am here for a special reason. I am not here for any order or as a committee; I am here at my own selection. I am here because I believe that law, equity, justice and right is on the side of that man. I am here because I believe I am here in the interest of my family. I am here because I want to see those whom I have been working underhandedly with. I am here to state, gentlemen, that my name is E. W. Drake; I am an engineer on the Chicago, Burlington & Quincy; that I am the man who wrote the letter, and I wrote that letter in good faith; that I wrote that letter expecting at that time not to come before the committee; that I expected to do that and no more; that I believed what I was doing was doing justice; that I believed what I was doing was in the cause of right and justice.

Gentlemen, I am in favor of this amendment because it is on behalf of the cripples, the dependent widows and orphans. I will ask you, gentlemen, to take into consideration human nature alone; is it possible that any man who understands this subject can come here and say to you that he is in favor of defeating that amendment when he knows that that law increases the legal rights of his heirs? That is the reason, gentlemen, why I am here speaking for that amendment; that is the real and only thing that is the object of the Burlington relief—to defeat some of the legal rights of the cripples, widows and orphans, those that now exist and those who are liable to exist. The only real difference in the statement of facts on their side of this question, gentlemen, is as to the explaining of the purpose of the Burlington relief on the Chicago, Burlington & Quincy. It seems to me, gentlemen, we should get at the real sentiment of the members of this relief and get it before this committee; but there seems to be naturally a hesitancy. I cannot bring this matter before you in any better way than simply to relate one experience in the relief. I became a member of the Burlington relief when it first started. I was simply solicited and joined it without giving it any serious consideration I did not study it, and was satisfied with it. So far as insurance is concerned, I have no word to say against it. What I say against it is what I have already said in regard to the real and ultimate object.

So far as insurance itself is concerned, I say again, I have no word to say against it. I might admit for the sake of the argument that the Burlingrelief pays out, it has been stated, some $50,000 or $60,000 a year. It also fell behind some $7,000 or $8,000 a year. Where do they get their remuneration for this $50,000 or $60,000, and the $7,000 or $8 000 that it lacks of being self-sustaining? Let me give you an example. Supposing I am on my engine; through their negligence that engine is wrecked and my existence here on earth is terminated. The first thing that is done they will go to my wife and say to her, "If you are needing any immediate money, here we have got it here to supply you. We will supply all your wants." My wife will sign the receipt for this money, thereby barring her action against the Chicago, Burlington & Quincy company. I am supposing this an absolute case against the company. I am carrying only $500 insurance, the company is ahead $4,500 if she gets what she was entitled to. If she elects to sue the company, or make the company settle with her, she forfeits and gives to the company the $300 or $400 I have put into the relief. I was for four or five years in the fifth class, paying $45 a year. I am now paying $1.50 a month, or $18 a year. If you figure up the amount I have been paying in there it will amount to $300 or $400. That she donates to the company if she elects to take her right of action against the company. There is where the $50,000 or $60 000 comes from for paying expenses that the company lacks of being self-sustaining. Gentlemen, I am willing to admit further, that there are a great many law suits brought against the railroad company unjustly, where in the first place there is no cause of action against the company. Where there is one just cause of this kind let us give these people that are justly entitled to it this cause of action, do not bar them from it.

I was going to relate some of my experience in the Burlington relief. I am afraid some of my friends will say, or the officials, probably—and I have a great deal of respect for nearly all of our officials—that this is the second heinous offense Drake has committed as being a conspirator and working against the interests of the railroad company. Some three years ago I took it into my head I desired to withdraw from the relief I, with two other gentlemen, as good possibly as ever worked for any company, and done as much and their services were recognized to be as competent as any, possibly, that ever worked for any railroad company, we got it into our heads that we were being imposed upon to a slight extent, and didn't like it. We had found time to study up and we desired to withdraw, and we didn't know exactly the process to go through to withdraw. We therefore concluded it would be best to write up a paper, and I wrote up a paper asking the company to release us from the Burlington relief. The paper was handed to the others and signed, supposing that that would be the only way to get out of the relief It was handed to one gentleman, and he says: "Here, boys, you are doing something that the company is going to censure you for. They will look upon that as evidence that you are traitors to the Chicago, Burlington & Quincy." I said: "If the company has any idea of that kind, let's destroy the paper, if there is any regular form to go through to withdraw from the relief" He said: "We have discovered that there are regular blanks to sign" So we destroyed the paper and went and withdrew from the relief in the regular order. That was the cause of an investigation; somebody had reported us and it was the cause of an investigation and I made a statement These other parties were called upon for a statement, and I made a statement afterwards, stating the exact truth, the exact cause for our desire to withdraw, and not knowing the regular form, and stating the facts to them as near as I could. In a few days our foreman got a letter that, on account of good services, Drake and one of the others you can retain in the service, but discharge the other. Since that time that other man has been reinstated for some cause. I, for awhile, was out of the relief, when different ones came to me, officials of the road, and says: "Drake, you had better get your name back on the relief — get your name back on our books; you will find that it will be to your interest to get your name on our books" Well, I was not in a position that I decided I wanted to quit the road I desired to stay with them. They had always treated me heretofore as a gentleman, up to this time, and yet unjustly censured us, gave us a pretty strong scoring as being traitors to the interests of the company, so I went back into the relief, and I have a policy. I have instructed my wife that in case of my death she have no dealings with the company's claim agents until she has had the case thoroughly investigated, and I give Mr. Corwin credit for giving all the men these instructions. If he can explain why he gives these instructions and they are in the interest of the company, I don't understand it.

You may wonder why I should undertake to do underhanded work in this manner. A man is naturally inclined to care for his interests, and where this relief has been censured once in an honest way as we did and one man discharged, it is enough to put us on guard and fear that any attack on this relief, or any opposition to the company, would be met with the same treatment that gentleman met. A week ago Sunday there was a meeting held in Chariton, as Mr. Corwin stated. Prior to that time there had been considerable talk as to the object of the Temple amendment, what effect it would have upon us and our families, and when this meeting was called we had an idea what it was called for. I had already at that time made up my mind I was going to have nothing to do with it; that I would stay clear of these things; that I was not in a position to say one way or the other; that I desired to continue in the service of the company and I desired to do what they wanted me to. They called upon me about this meeting and insisted that I should be present. I asked to be permitted to stay away, but no, they insisted and I went, and after we got to the place of meeting it was insisted that I should act as chairman I acted as chairman, and all that there was to do was a statement of the object of the meeting by one of the lobbyists in this place and these resolutions presented, and a motion made and seconded and the resolutions passed. There was not a dozen persons there. Gentlemen, I am prepared to say, and I believe I could speak not only my own sentiments, but I could speak the sentiments of nine-tenths, ninety-nine-hundredths of the men of Chariton, outside of the clerks and officials and foremen, and that class of employes, that feel that they do not dare to get up and oppose these resolutions. Now, I want to state further that a week from that time your lobbyist here for this relief department asked for more time, and sent up there over the signature of no official — there was no official signature there — this request for the different members of the Burlington relief to sign affidavits. It was the intention to get every member there to sign affidavits, and I think every member in that city on that day was solicited, and I think they got eight or nine affidavits to the effect that the relief was a great and glorious thing to them and they didn't desire to see any legislation affecting it. I think seven or eight or nine signed it. I tell you, gentlemen, a man came to me with tears in his eyes and says, "Drake, I would sooner have that right arm taken off than to do what I believe to be unjust;" but he said further, "I have got a wife and I have got a family of little children depending on me. What shall I do?" I says, "If you feel like that you go and sign it." I tell you that plan has been followed not only in Chariton but all over the Chicago, Burlington & Quincy system. To prove what I say to be true, gentlemen, I want to state that you could travel from Pacific Junction to Burlington, and ask members of that Burlington relief how they feel, and nine out of ten of them would say, "We have no opinion to express." Right in that connection I want to relate a little bit of history. In 1893, I believe it was, a railroad commissioner was to be elected in the state. There was not a man on the Chicago, Burlington & Quincy system but what was out and open in his declaration that he desired to see Mr. Dey elected railroad commissioner because they knew he was the man that the railroad company desired. At that time the employes of the Chicago, Burlington & Quincy went to their representatives and senators, I mean their prospective representatives and senators, and made them sign papers that they would not do anything or assist in bringing about any legislation that would affect the interests of the railroads whatever. We did everything in our power to elect representatives and senators that had that sentiment, and now at this last legislature do you suppose if you had gone to a Chicago, Burlington & Quincy employe and asked him how he felt about the two-cent a mile rate he would say he was in favor of it or hesitate about it? There was not a man on that system but what was really working for the interests of the company. When it comes to the railroad company or our beneficiaries, gentlemen, we must stand by our families first, last and all the time.

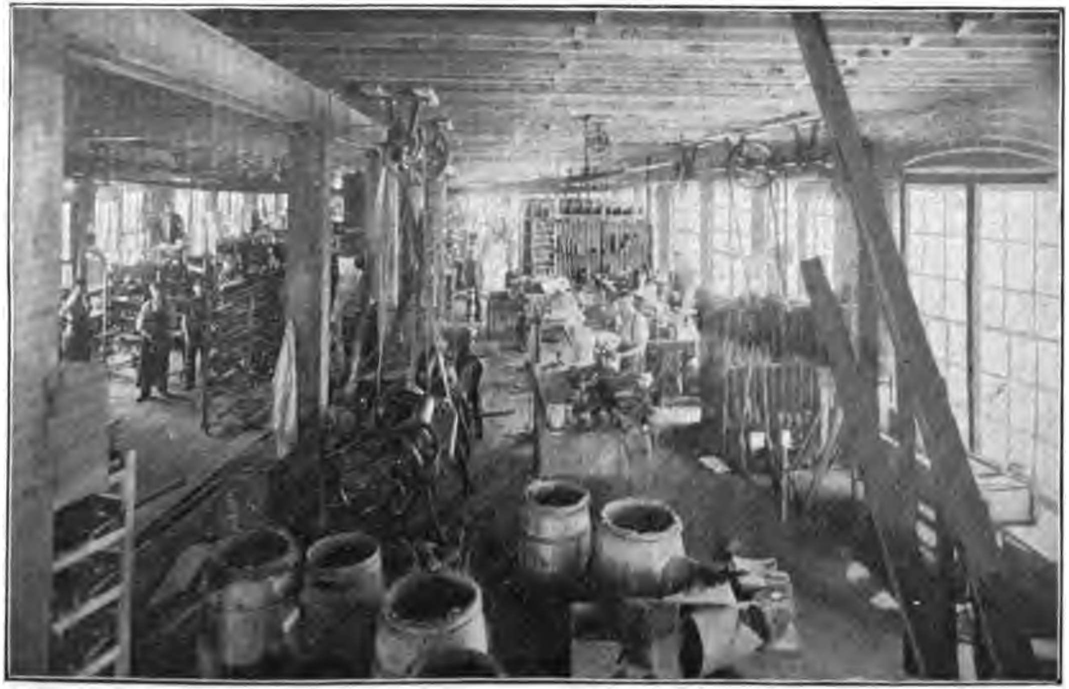
The primary object in coming here was simply to make a confession that I had done underhanded work, and so that underhanded work would not fall on somebody else's head. There are several men there from the Rock Island road and I felt that it might be possible that they might be dropped as being the author of the letter to this committee, and that was one reason why I came before you. The other reason is strictly personal· I am sent here by no organization and no body of men. I am here simply in the interest of E. W. Drake, and I believe the railroad officials honor me as a man more highly for my coming out boldly and declaring my sentiments than they would if I had continued in the way I started.

I have stated as nearly as I can the real sentiment felt by myself, and what I honestly believe to be the sentiment of a great many men against the Burlington relief. You can see it is one point of human nature, whether it would be human nature for us to work in favor of the Burlington relief as against our own interests. There is nobody else interested in this. The outside world don't care one fig. The object of this insurance is to deprive my wife of the rights she has to not only secure what I have paid for, but retain her right of action against the railroad company in case she has one.

Gentlemen, I will not detain you longer. You certainly understand me, and understand my position, and I believe truth and justice is all-powerful and so must prevail.

MR. WILLS: With your kind permission, I would like to ask Hon. L. S. Huntley if he will make a few remarks.

MR. HUNTLEY: I did not intend to make any remarks now. I had heard previous to coming here that there were to be some affidavits presented here to rebut what I said before you the other night, and I had also been told that they would present affidavits here to make it appear before this committee that I had never talked with any of these railroad men in Chariton; but I don't know whether there are any to that effect or not. Personally I do not care. But I will just say that if this committee has any doubt on that subject, I have some personal letters from different men at Chariton who are in the employ of the Chicago, Burlington & Quincy railroad, and if they desire it, at some future time, if they will let me know, I will let them see those letters, all except the signatures. Those were confidential letters written to me, and I cannot disclose the signatures of those men under any consideration, but I will let the committee see those letters if they wish to substantiate what I said the other night; and in addition to that I have a sworn statement here, which has been alluded to by the gentlemen from Chariton, which I will turn over to the gentlemen on the other side, and if they want to read the heading of that they



SECTION OF STOCK FITTING ROOM, GREEN WHEELER SHOE CO., FT. DODGE.

can do so. I will just say that that sworn statement is signed by ninety-three as good citizens as there are in the town of Chariton, including nearly all the city officials and all the county officials. I have looked over the list very carefully, and I am personally acquainted with nearly every man's signature that is on there; and there is also one member of your honorable committee who is personally acquainted with these men, and he can verify what I say in that respect.

I only wish to add just one word in regard to my friend Drake, who paid me a very high compliment in his remarks here to-night. I will say that there is not a citizen in Lucas county who stands higher — both among the railroad officials and among citizens of the county — who stands higher in regard to integrity, than does Mr. Drake. He is a man whose character has never been assailed, and no one in our community ever questioned anything he would say, but what it was true.

CHAIRMAN: I would like to state to you, Mr. Huntley, that there is nothing in these affidavits that were sent up here that in any way contradicts the statement you made the other night.

MR. WILLS: May we have permission to read the document presented by Mr. Huntley?

CHAIRMAN: Yes, sir.

[Affidavit of Chariton citizens read.]

MR. WILLS: As I stated, we were unprepared for what we have met here and, in the language of my friend Corwin, we have met with a few surprises. But as we have ten minutes, I would like to state that there is a gentleman here in the room, Mr. Conway, and if any of the members of this committee would like to question Mr. Conway I would be pleased to have them do so; and, in fact, would ask you to question Mr. Conway, if you will.

CHAIRMAN: We will not take up the time to do that, but if Mr. Conway wishes to make any statement we will be pleased to hear it.

MR. CONWAY: I am the man that most mysteriously disappeared here the other night. You know a man is very liable to do that, especially when he meets an old-time friend. This Burlington relief I don't know very much about. But I have got a little family—a wife and two children —at home in a destitute condition to-night, and I am crippled so I am not able to make a living for them, through this elegant Burlington relief, that our distinguished corporation friend stands there and says is an elegant thing. I have got lots of friends in Creston, in the neighborhood where I live, and I have got lots of friends on the road—boys I worked with—that are afraid to speak to me on the street because I brought suit against the railroad company.

As far as the men on the Chicago, Burlington & Quincy are concerned not being in favor of the Temple amendment, I know better because I know them all on the west Iowa division, and I know their feeling in regard to it. I am not a lawyer and I am not going to try to make any speech, but if any of these gentlemen want to ask me any questions I would like to have them do it. I thank you.

MR. WILLS: I presume no exceptions will be taken to my hesitancy, as the hands of the clock move right along. I don't know of anything more that we wish to say on this subject. I believe that we are ready, under the circumstances, to consider our side of the case closed. The testimony that has come to us, most of it voluntary, has been put forth here with the best of our knowledge and ability. We won't attempt to sum up the case, point it up, as the attorney of the Chicago, Burlington & Quincy did about one hour ago. We will rest the matter where it is and hear the other side of the case for the next thirty minutes. We thank you most courteously for the kind consideration you have given to our committee.

MR. CORWIN: You asked to have some men brought here. We did not know anything about who you were going to have brought here. These men are here, and I expect you have retained the list you made. If you wish to call them they are at your disposal. There are two or three matters we would like to have presented by Mr. Guernsey.

MR. GUERNSEY: Before doing that I would like to ask Mr. Drake, if he is still here, if he is willing to give us the name of the man who was discharged, he says, so we can run that down and find out what the records show with reference to it. We would like to have the name of that man and the date, and we can see no objection to it if the man has been discharged, because it certainly cannot hurt him any.

MR. DRAKE: The man has been reinstated, but I can see no reason why his name could do any harm because he is now not a member of the Burlington relief. His name is E. E. Gray. I can't tell you the date, but it was about three years ago.

MR. GUERNSEY: I want to thank Mr. Drake for his courtesy in the matter. What I have to say will be strictly in reply to what has been said by the other side. In the first place I shall take up the question asked by

Mr. Wills, because I believe it is a pertinent question. It was one that had suggested itself to me and the answer was suggested to me by one of the Burlington men. It is this. The men, in conjunction with the other members of the advisory board, have the right to change these articles, and what he said they would do was this. He said the men in the other states would be unwilling to carry the Iowa men if they were not upon the same basis, and that they would demand a change in the rules that should separate the Iowa men and compel them to pay for what they got. That is the answer to that question that was suggested to me by a member of the department I have looked up the rules far enough to see that they contemplate such changes There would be no question about their power to do it, because the members are solicited from the different divisions and the Iowa members would be in the minority.

Now, I wish to say a word with reference to what has been said by Mr. Stuart. I dislike to be personal, but you doubtless, many of you, know that Mr. Stuart is the editor of a free silver paper in Chariton. I have forgotten the name of it, but doubtless most of you do not know that the Burlington road did not renew its advertising contract with that paper this year. Why, I do not know, but I have been advised that the Burlington road was on that account almost immediately assailed in that paper, on that ground, and it was assailed in connection with this matter over Mr. Stuart's signature in one of the papers here yesterday. I feel more justified in doing this because the letter from the railroad attorney in Chariton which he mentioned is, I believe, from his brother, so that that family at least does not seem to be united upon this question. I do not care to answer Mr Stuart in detail, because I am satisfied that the members of the committee know that so far as he criticises the railroad his statements, when they were statements of fact, were founded upon a misapprehension, because it was manifest from his talk here that he is not familiar with the facts with reference to the relief; in fact, I believe he said so. I presume that is also true of a great many of these men who signed these affidavits.

I wish to thank Mr. Drake for coming here and standing up like a man and telling what his objections are to this department.

I didn't believe that the men on the Burlington road had any less courage or manhood than the men on the other roads, and I am glad that instead of an anonymous we have a man who comes here like a man and tells you what his objection is, because we can answer that and we can't answer anonymous letters. I want, personally, and in behalf of those associated with me, to thank Mr. Drake for what he has done.

What was Mr. Drake's objection to the relief association? There is the nub of this thing. He stood up here and he told us what that objection was. He said in the first place it took away from his family a common law right. Now, we all know that that is not an accurate statement, that it took away no right, and that all that is claimed is that the relief requires his representatives if he is killed, or him, if he is injured, to elect whether he will exercise that right or not. He says that they come around to his wife if he is killed and tell her, "Here, don't you want a little money," and she, unsuspecting, accepts it and signs a receipt, and that ends it. In response to rule 63, which expressly prohibits that; that is, in death claims it is necessary that there shall be a release signed by the authorized representatives of the decedent as well as by the beneficiary before any money can be paid, and it can be shown by the book that I have in my hands. If you will turn to rule 63 you will find it there in the book, and it can be demonstrated that that is the uniform practice of the association. That simply means that the objection which was urged by Mr. Drake here was founded on a misapprehension of the facts. I give him credit for its being an honest misapprehension, but it, as a matter of fact, is a misapprehension.

What was the next objection? He said he had paid into that association some $300, and that if he died and they elected to sue, that money would go to the company, and in that way the company was reimbursed for the money it paid out. The fact is that does not go to the company. Not one cent of it goes to the company. Not one single dollar of it has gone to the company. Every dollar of that is held for the benefit of this relief association, and belongs to them, and the company is not entitled to a cent of it. I can give Mr. Drake credit for an honest mistake, but it is a mistake.

What other objection did he make? None. Those are the only objections that he made, and those objections are not founded in fact. I will call attention to another thing that was said. I will give him credit for having a proper purpose, because I admire a man that has enough manhood to come here and not write an anonymous letter, and I believe there are more of them if they wanted to come. I don't believe he is the only man in the Burlington company who has got any courage, and I believe you would find others here, just as he is here, if they thought they ought to be here. He says this: When he wanted to withdraw from the association the boys said, "Why, you must not do this; the company will censure you." There is no claim here that anyone in authority had any knowledge of that. There is no claim here that any man in authority said that. There is no claim here that that is anything more than a surmise on the part of some one, and it is stated that instead of being permanently discharged, every one of those men who did that thing is now in the employ of the Burlington company. One of them was laid off and reinstated. I cannot tell you why, now. I cannot tell you what the records show now, because I have had no opportunity to ascertain. But the fact does stand here, confessed by Mr. Drake, that every one of these men is now in the service of the company, which is a complete refutation of the claim that a man who does not back up the relief cannot stay and cannot get into the service. Now, if I heard him properly, there was a reference made to the fact that Mr. Corwin had advised the men not to improvidently accept benefits. In the first place, it shows that Mr. Corwin, who was, I believe, then a member of the relief, was telling the men that they ought to look out and have their rights and exercise the right of election, which is their right, that they have under this agreement. It shows another thing — that the attention of the men was being brought to the character of this contract, and to what it was necessary for them to do under the contract, so that they were not being misled, so that they were not being put in a position where they might give away something inadvertantly. In other words, this man, who was a member of the advisory committee, was doing just what we have claimed for that advisory committee, namely, standing there as a representative of the men.

I am told at this moment that we have a list of the names of the men who have withdrawn from this association during the time it has been in operation here in Iowa — that is, the men on the Iowa division — and that record shows Mr. Drake is mistaken; that Mr. E. Gray never withdrew from the association. The record does not show that he ever withdrew from it. The record shows Mr. Drake's name, but not the name of Mr. Gray.

A reference was made, and I think there Mr. Drake let his fancies as an orator rather get away from the fairness of everything he said, to the lobbyist—a hard job, Mr. Wills will agree with me—to the lobbyist who presided at the meeting in Chariton. This disaffection seems to be confined to Chariton, which is only one station in Iowa, That lobbyist you will recognize in a moment when I name him. That lobbyist was an engineer by the name of Price, who is laid off by sciatic rheumatism and stood up before this committee leaning on a cane, who told the committee what he thought of this department, and who is drawing $3 50 a day from the department. You know just how much lobbying that man did. I don't, but you do.

There is another thing you gentlemen should know more about than I do. It is charged that the officers of the Burlington system went to their members in the legislature about four years ago and demanded of them a written pledge before their election, that they would not be guilty of any legislation that was inimical to the interests of the Burlington road. I never heard of that, and that is something we do not need to refute because the members of the legislature will know whether they have done that a great deal better than I do I don't suppose that they did it, and moreover, it is hardly material to this controversy. That I believe is all I care to say in response to what has been said by Mr. Drake. In summarizing that I simply want to call attention to the fact that his objections to the relief are founded upon what we have shown and what you know, so I do not take time to show it again, to be misapprehensions as to matters of fact. What his opinion would be if he were familiar with the facts I do not know.

Now I want to refer to the Conway case, and before I do it I want to say to this committee, and to everyone here, that I would be the last man in the world who would ask anyone not to sympathize with Mr. Conway in his present condition. Mr. Conway has a right arm that is practically useless, but the Burlington Relief associatin is not responsible for that condition. I can confine what I say about the facts with reference to the way in which that accident happened almost entirely to what purports to be an interview with Mr. Conway in one of the morning papers, so that I can confine my statement to himself, though I believe that in some respects he is misquoted. He is reported to have said that at Red Oak, during the World's fair year, when he had a heavy train and was engineer, he was told that they were going to put on another engine and make it a double header. I understand that they were to couple on another engine. Knowing this, he was oiling his engine. A long stemmed oiler is provided for the men so as to avoid danger that would be incident to putting their arms into the machinery. I am advised that he was using a short stemmed oiler. He stuck his arm through the drive wheel of the engine, the other engine or car was coupled on, his engine moved slightly and his arm was broken. He was at that time a member of the fourth class of the relief department, which pays benefits at the rate of $2 per day. The contribution which he was making was $3 a month. At this rate he was paid benefits from October 16, 1893, to August 6, 1894, inclusive. He then thought he could go back to work. He tried to run an engine and could not run it satisfactorily. I don't know whether he thought he could himself or not, but I do know that no one would say that it was safe for a man with only one arm he could use to attempt to run an engine. Within a week after these benefits ceased they commenced again and he was paid benefits at the rate of $3 a day from August 13, 1894, to October 22, 1894, which completed fifty-three weeks. Thereafter he was paid benefits at the rate of $1 per day until January 31, 1895. The trouble with his arm was that they did not get what they call a bony union, the bones where they had broken did not properly knit. He was taken to Chicago at the expense of the department and two surgeons, both of them men who stood at the very head of the profession in Chicago and in the country, examined him. They told him that they could operate on that arm, and that the chances were ninety-nine in 100 that it would be made as good as ever. The relief department offered to pay the expense of the operation; to pay the charges of the surgeons: to pay his charges in the hospital, and continue these benefits to him while he was in the hospital if he would submit to the operation The operation, as I understand it, consists in removing a growth on the ends of the bones and getting them together properly so they would grow together again. Mr. Conway refused to do this The department then learned that there was a surgeon near his home in whom he had confidence, and who I believe is in this hall to-night, and they said if he would permit that man to perform the operation they would make the same proposition with reference to the expense. Mr. Conway declined this. The department, which was paying him $1 a day benefits, then offered him a job as watchman at $40 per month. Mr Conway declined this. The department then told him that under those circumstances it did not believe that it was just to compel the men to permanently pay him benefits and gave him, after all of these negotiations, two weeks within which to determine whether or not he would accept any of those propositions, telling him if he did not accept at the end of the two weeks the benefits would stop. Mr. Conway declined to accept. Mr. Conway has brought suit against the company, claiming benefits for the remainder of his life, and claiming $15 000 on account of malpractice in setting his arm. I am advised, also, that the physician who set his arm was the physician who was selected by Mr. Conway, and that the claim for damages on account of alleged malpractice is based upon the fact that the relief department paid that surgeon his charges for the services that he rendered to Mr. Conway. Under these circumstances, I think you will agree with me that Mr Conway would be unable to recover a dollar from the Burlington road for which he brought suit, because I believe there was contributory negligence. I think you will agree with me in the next place that the relief department has not abused him. The total amount paid Mr. Conway, as shown by this statement of Mr. Conway, in benefits $829 and doctor bills of some $44, making an aggregate of about $880. The statement that the benefits have been cut down since the department was organized is founded upon a misapprehension. They have not been cut down, and every change that has been made in the rules has been in the direction of liberalizing them, except that, at the instance of the men, the requirements with reference to life insurance have been made stricter so far as physical condition is concerned, so as to put it on a sounder basis.

In that connection I believe I am safe in saying that there is not a single department of this character in this country that has as many liberal features as are found in the Burlington plan.

Gentlemen, I believe I have answered what I care to answer, and I thank you for your attention.

SENATOR BERRY: I desire to ask Mr. Conway a question. I would like to know who your attorneys are in this suit against the Chicago, Burlington & Quincy?

MR. CONWAY: Earle & Prouty.

SENATOR BERRY: I would like to ask Mr. Stuart the names of the officers of the company who were present at this meeting at Chariton a week ago last Sunday?

MR. STUART: Mr. J. P. Evans was there. He is master mechanic. He employs the engineers at Chariton. I don't know whether that is his title or not.

SENATOR BERRY: Who else?

MR. STUART: There was that distinguished Jim Harrison, the detective. Royal imperial detective on the Chicago, Burlington & Quincy.

MR. GUERNSEY: There are some men here who were sent for by the committee. I don't know what their names are and I never saw one of them in my life. It would please us very much if you gentlemen would retire to a room where there is nobody present who can give anything away and cross examine these men—where there is no one near that can be said to be sitting by to coerce.

CHAIRMAN: We do not desire to do that, but we will call some of them here.

Jacob Castline was called and examined as follows:

Q. Did you make that affidavit?

A. Yes, sir.

Q. Is that your signature?

A. That is my signature.

Q. I will ask you, Mr. Castline, if the statements made in that affidavit were made voluntarily and are true as you believe?

A. Yes, sir. The statements are exactly as I regard the Voluntary Relief association of the "Q."

Q. Who asked you to make that affidavit?

A. No one, more than Mr. Corwin and Mr. Robertson, who stated the amendment had been laid before the senate, which would be a detriment to the Voluntary Relief department. We studied over the amendment and found where the amendment, if put in force, would cripple the department and we as employes would suffer.

Q. There was no one asked you except Mr. Corwin?

A. No one asked me.

Chas. O. Eggleston, being called, was examined as follows:

Q. Did you make an affidavit?

A. No, sir; I just wrote a letter.

Q. Were you coerced in doing it in any way?

A. No, sir; I did it because I wanted insurance.

Q. You live in Burlington? What do you think is the prevalent opinion of the boys in Burlington in regard to this department?

A. As a general thing they think it is a very good thing. Very nearly all the men are in the department, with very few exceptions.

Q. Have you ever drawn any relief from this department?

A. I have never drawn a cent from it. I have never been injured and have never been sick since I have been a member of it.

Bryan Chanton, being called, was examined as follows:

Q. Are you a member of this department?

A. Yes, sir.

Q. Did you make an affidavit?

A. Yes, sir.

Q. Was that of your own free will and accord when you made it?

A. Yes, sir.

Q. Tell me the condition of the boys in Chariton as far as you know. Do your boys coincide with what Mr. Drake has said?

A. I could not say, as I have not talked with any of the boys for the last ten days.

Q. Are you perfectly satisfied with the workings of this relief department?

A. Yes, sir; as far as I am concerned.

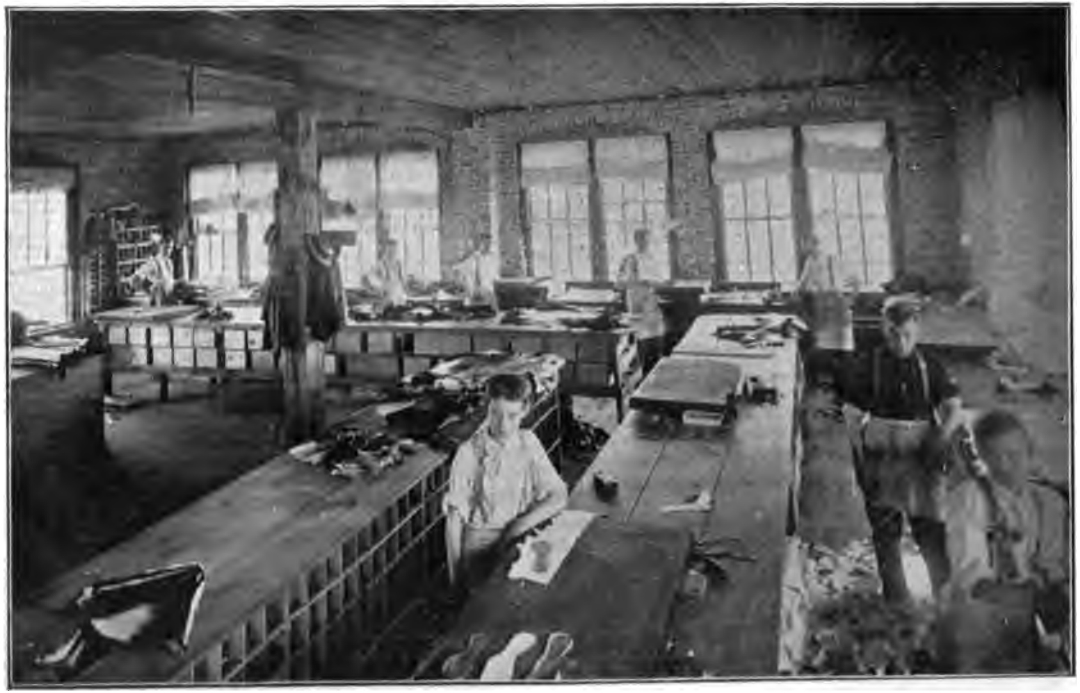
Q. Have you ever drawn any benefits?

A. No, sir.

Q. Is there anything you desire to state to this committee?

A. Nothing.

Mr. Combs, of Red Oak, being called, was examined as follows:



CUTTING ROOM, GREEN-WHEELER SHOE CO., FT. DODGE.

Q. Have you written letters or made affidavit in regard to this relief department?

A. I have not, sir.

Q. In what department of railroad service are you employed?

A. Locomotive department.

Q. You carry insurance in this relief?

A. I do.

Q. Have you ever drawn any benefits?

A. I have not, sir.

Q. Are you perfectly satisfied with the relief and the manner in which you were enlisted in this relief?

A. I am.

Q. Were you coerced in joining the relief?

A. I was not.

Q. Do you think it would make any difference with you if you would let your relief lapse?

A. No, sir; I don't think it would.

Q. Do you know any of the boys in Red Oak who have let their relief lapse and still been retained by the company?

A. No, I do not. I do not call any to my mind at present.

Q. What is the prevailing sentiment at Red Oak, do they feel they are coerced into joining this relief out there?

A. No, sir; I don't think they are.

CHAIRMAN: We will consider ourselves adjourned.

Upon a motion to adopt the house amendment by the senate railroad committee the amendment was defeated, but two voting for it, Senators Hobart and Garst. Senator Berry of Indianola then introduced what is known as the Berry substitute and which is as follows:

If any such corporation maintain a relief department for the benefit of its employes, to which such employes in any manner contribute, and in the contract for which it agrees, in case of accident resulting in injury or death, to pay to its employes any insurance, relief, benefit or indemnity, and in which contract it is provided that if the person injured, his beneficiary, heirs or legal representative shall accept such insurance, relief, benefit or indemnity, such acceptance shall be a bar to any right of recovery on account of such accident, then and in such case, the person so injured, his beneficiary or legal representative shall have not less than thirty days from the date of such accident in which to elect as to whether he will accept such insurance, relief, benefit or indemnity, or rely on his right of action against the corporation, anything in the contract for such insurance, relief, benefit or indemnity to the contrary notwithstanding; and the acceptance of any such insurance, relief, benefit or indemnity within said thirty days shall be no bar or defense to any action brought under the provisions of this section. In case any insurance, relief, benefit or indemnity is paid within said thirty days to the person injured, his beneficiary or legal representative, and suit is brought under the provisions of this section to recover on account thereof, then the said corporation shall have the right to have the amount so paid, set off, for the benefit of the relief department, against any claim which the person so injured, his heirs or legal representatives may have against it on account of such injury.

The senate committee recommended to the senate the adoption of the above substitute, Senators Hobart and Garst making a minority report recommending the passage of the Temple amendment. The report was made to the senate April 3d, and was set for a special order of business April 7, 1897. When the time arrived for the special order, Senator Penrose asked that the minority and the majority reports of the senate railroad committee be read. This was done. When they were read, Senator Hobart moved to substitute the minority report for the majority report, and in support of which he offered the following:

Senator Hobart, in speaking in support of the minority substitute, said:

The minority of the railway committee, after careful examination of the Temple amendment as it came over to the senate and as they have reported it back to the senate, have concluded that the substitute now offered would answer the purpose better, and would also answer some objections that they have made in regard to the Temple amendment as it passed the house. The word "such" was inserted between the words "any" and "insurance." The minority has also added to that amendment after the word "injured" the words "his heirs or widow or legal representative," and at the end of the amendment we have added the words, "and nothing herein contained shall be construed to interfere with the settlement for damages." They believed that would answer the objections that had been made, that no settlement for damages could be made after the accident, independent of any contract of insurance. They also believed that it was actually necessary to bring out the idea as it was intended by the Temple amendment that the words "his heirs, his widow or legal representative" should be inserted. It should be provided that a settlement made with the widow, heirs or legal representative should not be binding. We offer this as a substitute for what is known as the Berry substitute for the Temple amendment. This was offered by the senator from Warren in the committee and was adopted by the majority.

I cannot conceive, Mr. President, of an amendment that would be more acceptable to the Chicago, Burlington & Quincy railroad, or to the relief department, than is the Berry substitute. It is a wonder to me that they have not heretofore had some such regulation as this incorporated into their little book on rules and regulations. It is absolutely satisfactory to the relief department, and I am borne out in this view by the number of petitions that have been presented here this morning, on the eve of the consideration of this measure, asking that the Berry substitute be adopted, coming, as they do, from the line of the Chicago, Burlington & Quincy railroad.

Now, we have heard something in regard to the unconstitutionality of the Temple amendment. I find piled upon my desk here various pamphlets and documents to the effect that the Temple amendment is unconstitutional; but let us see why it is unconstitutional. What argument do they urge? They say that it abridges a person's liberty, that it abridges his right of contract, and they tell you that the Berry substitute is the thing that should be adopted in lieu of the Temple amendment. What does the Berry substitute do? Why, it abridges the right of contract for thirty days. Now, I submit that in view of the fact that this argument is offered by the opponents of the Temple amendment, would not it also be open to the charge that it is unconstitutional? If one is unconstitutional, the other is unconstitutional.

They tell you of the beneficence of this institution that is organized down there on the Burlington road by the railroad company. Intended for charity, they would have you believe. Why, I have heard in the committee night after night as we met together that this was such a wonderful thing for the men on that road. After I had heard all these things I almost came to the conclusion that we had been mistaken, and that the old saying that "a corporation has no soul" was a mistake. But here was a corporation with a soul which had bubbled up and bubbled over in its beneficence to its employes. But I took up one of their pamphlets and read the statement of the amount that had been paid into the Burlington association and the amount that had been paid out thereof. The total amount that the men paid in was $1,475,985.71. I then found in another place the total amount of benefits paid out to the men to be $1,422,922.60; leaving a balance of $53,063.11 in the hands of the company as a result of the business. What a beneficent institution the Chicago, Burlington & Quincy is—to pay back to the men on that road what is collected from them except $53,000, which is retained in its own hands.

SENATOR TREWIN: In making that statement have you taken into consideration the expense of conducting the relief department?

SENATOR HOBART: Yes, I have. The Chicago, Burlington & Quincy railroad reports $379,192 as the expenses of distributing this money. Yet the $53,000 that was left over and above what they paid out to the men by their beneficence was sufficient to pay the expenses of distributing that money. Then I read further. I examined the little blue book. My faith had been somewhat shaken when I found this state of affairs; when I found that the men paid more money in than had been paid back to them. I found all these signal benefits destroyed. I also read that in consideration of the amount paid by said company for the maintenance of the relief department the acceptance of benefits from the relief association is a full satisfaction of all claims of damage against such company, whether responsible directly or indirectly, for such injury or death. When I read that it knocked the wind out of the whole business, it was a relief department, but it was a relief department for the benefit of the Chicago, Burlington & Quincy, and they resolved themselves into a common, ordinary corporation without any soul at all. It is a good thing to have a relief department of this kind, when they have a balance of $53,000 in their hands and when they can get the 8,000 men on their road to abrogate their rights to sue for damages for the injuries received through the negligence of that company. Figures cannot tell what the "Q" has saved by this, but oh! they tell you that it is better for the men themselves. It saves them from law suits and saves lots of expenses to the men; that they do not have to go into court and engage in expensive litigation. It does not save these men a dollar. This benefit association is maintained and carried out for the benefit of the "Q" alone.

At this point the presiding officer rapped for time, and Senator Cheshire moved that the ten-minute rule be suspended for the present discussion. A roll call was demanded. The motion to suspend was defeated by the following vote:

Yeas—Senators Alexander, Bonson, Cheshire, Downey, Druet, Ellison, Funk, Gilbertson, Gorrell, Healy, Henderson, Hobart, Lothrop, Penrose, Ranck, Sargent, Trewin—17.

Nays—Senators Allyn, Bell, Berry, Blanchard, Byers, Carney, Carroll, Craig, Eaton, Ericson, Everall, Harper, Harriman, Hotchkiss, Hurst, Junkin, Kilburn, Mitchell, Palmer, Perrin, Phelps, Pusey, Riggen, Rowen, Upton, Waterman—26.

Absent or not voting—Senators Lehfeldt, Ellis, Young, Carpenter, Hipwell, Hurst, Hospers—7.

As soon as the vote against long speeches was announced, Senator Blanchard took the floor and read the following paper:

The question involved in this proposed amendment is a grave one. Shall the legislature interfere and, by public law, prevent parties of mature age, of sound mind and discretion, from entering into the contract of the character of those described in the amendment? Ordinarily, parties are permitted to make their own contracts. The right to do so is one of the highest privileges and prerogatives of an American citizenship. It is the aim of the law, as it is the spirit of our institutions, to grant the widest freedom to the individual compatible with the rights of others. The right to labor, to earn money and accumulate property, is a barren right, if, after so acquiring property, the individual is deprived of his power to control it. The right to control one's own property involves the right to make contracts respecting it. The legislature has no constitutional or moral right to interfere with individual contracts, unless such contracts are in their nature immoral or are against public policy.

It is not claimed, and cannot be claimed for a moment, that these contracts of insurance are immoral, for they are of the same nature as those entered into with all life insurance companies. We can rarely find an individual who has not at some time in his life entered into similar contracts. The only reason I have heard suggested why these insurance contracts are against public policy is that they are obtained by a species of force or coercion. In other words, that these contracts are not entered into voluntarily by the employes of the railway company. This is a serious charge, and, if true, the wrong should be prevented and the individual protected by legislative enactment. Both parties have had their representatives here who have appeared before the committee and have furnished it and the members full information on the subject.

After gaining what information I can on the subject, I am fully persuaded that the only plausible reason given why the legislature should declare such contracts illegal, is the claim made that the members of this relief association are compelled, or coerced, against their will, to join the association or department and to pay the monthly assessments.

If this charge is not sustained, then there is not only no reason why the legislature should interfere, but such interference would be in itself highly reprehensible as depriving the individual of his sacred right to manage his own affairs. It would also be a clear violation of his constitutional rights.

That these contracts are not compulsory—that the individual employes of the railway company are not coerced into joining the relief department—is, to my mind, clearly established by the following facts:

First.—Five hundred members of the relief association have made their sworn statements, and filed them with the committee, to the effect that there was no coercion and that their connection with the relief association was voluntary on their part. This, alone, would be sufficient to establish the fact in any court of justice.

Second.—It is established by the published statements of the railroad company and of the members of the relief department that during the past year over five hundred new men were employed by the railroad company and that less than one-third of them joined the relief association. If this be true—and I have not seen it denied—it furnishes the most conclusive proof that there was no coercion; otherwise all would have been compelled to join.

Third.—The highest tribunal in the land, after a full investigation of the facts, has judicially declared that the contract is "fair and not inequitable," and furthermore that "the department is purely voluntary."

This decision was made by our own supreme court, consisting of learned and impartial judges, in whom the people of the state have implicit confidence. It seems to me that this ought to be considered as absolutely conclusive of the question.

The proof is as strong as Holy Writ that there is no compulsion. Under such circumstances the legislature has no more right to declare such contracts void as being against public policy than it would have to declare marriage contracts void for the same reason.

The men in the employ of the railway company are intelligent and industrious men, and there is no reason to believe that they are not fully competent to make their own contracts. The adoption of this amendment would cast a reflection upon them, as it carries the assumption that they require especial guardianship and are not capable of making their own contracts. Men of spirit who prize their liberties will resent such an assumption. If they are imposed upon by fraud—if they are compelled to enter into contracts against their will—the courts, without further legislation, will hold such contracts null and void.

Senate adjourned until 2 o'clock P. M.

At the convening of the afternoon session, Senator Ellison opened the debate in favor of the amendment. He spoke as follows:

The question of the Temple amendment has become as familiar to us as any of the important measures presented at this session. Literature has been circulated freely, and wise men have interviewed us and given us the benefit of their experience and knowledge as to the effect of such a measure. It is my opinion that when we consider this matter in all its features and in connection with the recent decision of the supreme court of this state, and like decisions made by other courts, we are forced to the conclusion that the time has come when some definite action should be taken by this legislature in harmony with public policy and in accord with what has heretofore been regarded as the statutory provisions of our state.

It has been said by the learned senator from Mahaska, who read "his charges to this jury," that there is but one question before us; that is, whether the men belonging to this relief association are competent to make their own contracts, and whether we should interfere with them in the exercise of such rights. But that is not the question. We had supposed that we had a statute already which limited the right of making such contracts, but the supreme court in a recent decision has practically nullified that law, and by this amendment we are simply asked to give efficiency and potency to that statute. We are told that the supreme court of this state has decided a case upholding just such contracts. That is true, but we are not told to what extent the question of the employe's coercion was laid before that court. And to avoid the technicalities pointed out in that case and give force and efficiency to our present law, this amendment is offered and is set forth in the minority report.

We are told that there is no coercion used by the company in this matter. but I tell you that we all know that the very atmosphere of this room is saturated with the evidence and conviction that coercion has been used and that it has been satisfactorily established.

The fact that the power of the great Burlington & Quincy Railroad company is back of this association is no reason why we should not speak plainly if we are convinced that coercion has been used. It is our duty to deal fairly with this matter and to break forever the fetters of such contracts which bind the employes and laboring men of such companies by a bondage equal to that of the serf.

They tell us that men have equal rights in the management of the affairs of this association, but I contend that the controlling vote on the board of management is at all times under the control of the railroad company. They tell us it is a voluntary contract. This I deny. There may be no direct compulsion to join, but one thing is certain, and that is, that if they do not sign this contract they get no job. These companies have never felt the twinge of hunger, but thousands of employes have. They know what hunger and want mean. They know what it means to have wife and children at home suffering for the necessaries of life. The heads of families must provide for them, and it is under such necessities that men yield to the force of circumstances and subscribe to the conditions imposed. Thus it is that the circumstances and surroundings and the unreasonable conditions of this contract practically robs a man of his independence and manhood, and is vicious and degrading in its influence.

The railroad company is not entitled to any such unreasonable conditions of defense against its own liability as is given by this contract. When a man insured in this association is injured by reason of the negligence of the company or its employes, he should have his right of action against that company for damages, and the fact that he has signed a contract practically waiving that right, should not be allowed to be set up as a defense by the company but such contract should be declared to be contrary to public policy and void. The men pay for the insurance benefits which they receive from the company and, in my judgment, the payment of that insurance should be no defense or waiver to an action against the company for a wrongful or negligent act. You know that when an accident happens these companies instantly send their agents to interview the injured man or his family to assure them that the company will be glad to furnish a doctor, care and assistance in their hour of sorrow, and when care and assistance is needed. They promise to provide for the widow and the orphans, to bury the dead and wipe from the cheek the tears of sorrow, and for all this they simply want a receipt. There is no time for consideration or advice; the needs of the hour are pressing. The agent is kind, his argument convincing, and the receipt is signed, and the company is at once given a defense to an action for damages; it makes no difference how absolute the liability of the company was; it makes no difference who left the switch open that caused the fatal accident. It makes no difference whose negligent act brought sorrow and death to that family, after the receipt is signed, and the right of action is forever concluded, and the company that should have responded in damages goes free. I believe this to be a great wrong which never can receive the sanction of my vote.

I do not believe that men who are suffering from injuries, or widows whose hearts are wrung with sorrow should be concluded by accepting the insurance which they with their own means purchased, simply because the railroad company by shrewd manipulation have taken advantage of their misfortunes. And such contracts and such schemes should be declared to be null and void by the law making power.

Senator Harper followed Senator Ellison, but took the opposite side of the question, and addressed the senate in the following words:

Mr. President—I presume that I have the honor to represent, in my district, a larger number of persons, directly or indirectly interested in this question, than any other one member upon this floor. Because of this road's large shops, I suppose there are more Chicago, Burlington & Quincy railroad employes in my district than in any other single district in the state. There are said to be in my city more than 800 members of this relief department. Therefore, in taking the floor to speak against the minority report, I do so as the representative of more than 4,000 people, directly or indirectly affected by this proposed change in our law. I do not represent the railroad further than any other individual or concern in my district; but on behalf, simply, of the beneficiaries of this relief department, I appeal to you, senators, to leave this matter alone. This minority report asks you to enter the sacred precincts of this great industrial family and destroy a beneficent arrangement that, in my opinion, should receive your fostering care. I am told that on one of the two eastern roads that originated this plan or system they are now able to retire their old men upon a pension, and if this be true, then we should encourage rather than discourage the system.

Where does the demand for this legislation come from? Does it come up from the 13,000 employes of the Burlington road? I say no. Representing more of them than any other senator on this floor I ought to know. From the time this question began to be agitated here until now I have not heard one word from them against this relief department. Out of 800 men, employes of the road, who are members of the department, not a single one has asked me to support the amendment; not one has asked me to help lift the heavy and coercive hand of this awful road from their backs; but, on the contrary, I have here a stack of letters from these men urging me to vote against the amendment. You would imagine from the remarks of the senator from Jones that these men were mere tools in the hands of this corporation. Do you believe that? Do you believe that a body of 13,000 men can be gathered up from our splendid citizens, our free men, who can thus be led around by the nose? And for what—for the mere privilege of being allowed to earn a mere living.

It is well for the senators to bear in mind that the railroad bears a burden in this department as well as the beneficiaries. Running through this entire fabric like a golden thread is the guarantee on the part of the railroad company of every dollar of the obligations to these beneficiaries created by these contracts. When you consider they pay a sick benefit, ordinary death as well as accidental death loss, accidents happening on and off the road, during service or while off work, you can comprehend the sweeping extent of this guarantee. The senator from Cherokee said the contributions of the members had left a balance during the last year of $53,000 in the hands of the company, after paying all claims against the association. This is a misstatement which I am willing to believe was not intentionally made. The fact is that the figures he quoted covered a period of six years, the life of the department. During this period the road has furnished offices for the system's officers, have paid all the running expenses of the department, and paid in money more than $350,000 to make up the deficits and to meet the demands on the association. The question is, what effect will it have upon these men connected with the system if we crush the association out of existence? I warn you, senators, that this involves material rights of families; rights of men who for years have been connected with and contributing to this department; men who have paid for this benefit for years and now find themselves too old to obtain the protection elsewhere, and they appeal to you not to destroy this benefit which they have provided for their families when they are dead and gone. Before taking this step I appeal to you to weigh well what it involves and dare to do right in the sight of God and men.

Here the speaker began reading from an address by Superintendent J. C. Bartlett, of the relief department, before the St. Louis Railway club, setting forth the advantages of the department. He occupied the remainder of his time with this quotation.

Senator Lothrop addressed the senate as follows:

Mr President—It is not my purpose in the few remarks I may make upon this measure to attempt the enlightenment of my brother senators, nor in any degree to influence their vote, but merely to explain my own. Once only before have I felt called upon to do this, and now appearing to me to be necessary from the character of the legislation proposed, the peculiar circumstances of its introduction here, the grave importance, direct and contingent, of the questions involved, not only to those directly affected, but to the state at large, as well as those considerations that more directly concern myself as an individual.

I will not attempt to conceal the fact that in the consideration I have given to this bill, I have been subjected to an influence appealing to my personal interests, so far at least as my personal relations to a large number of my constituents is concerned —those whose interests may be affected by my vote to be given upon this measure.

At my home and in my district there are large numbers of railroad employes, in no way connected with the Burlington system, who, so far as they have made their wishes known, most earnestly desire the passage of this amendment, honestly believing, I am persuaded, that their interests as laboring men, and especially as railway operatives and laborers, are directly involved with its fate Among them are many whom I have been happy to claim as my warm personal friends and whose kindly regards I most highly prize, while to a much larger number am I indebted for the votes that gave to me the high honor of sitting in this hall as the representative of a large and important constituency.

In view of these considerations, I have endeavored to persuade myself that notwithstanding I do not agree with them, that I am fully convinced that they are mistaken, that the failure or success of this measure can in no way materially affect them and that in no way can they be injured by its defeat, I ought to cast my vote for it because it is their desire that I should; but, Mr. President, I have studied this question for myself, and from all the light I have been able to secure, I am satisfied not only that my railway friends are mistaken, but that there is involved in the passage of this bill questions more momentous in character, more extended in effect, than those who are urging that I give to it my support have, in my judgment, considered; and that so far beyond the interests of any individual or class of citizens does the fate of this amendment affect the great interests of the state at large, that my inclination and desire to gratify my constituents by giving my vote therefor, must yield to the higher and more urgent demand of duty.

Believing that I can neither serve them by my support of the measure, nor injure them by assisting in its defeat, and fully convinced that its adoption into law will establish a dangerous and vicious precedent, work an irreparable injury to a large number of our citizens directly and contingently affected thereby, and bring upon the state the odium of engaging in legislation extraneous to the purposes of government, having no other object in view than to prevent the free exercise of the right of contract between citizens, I am compelled to record my vote in the negative, knowing when I do so that I incur the disapprobation of those for whose good opinion I entertain a most profound respect

I am compelled to this conclusion, first, because there does not appear to be any demand for such legislation. When I became a candidate for the office I now hold and during the campaign preceding my election, the necessity for such action was never mentioned. Up to the hour of the passage of this amendment through the other house, I had not been informed and had no information whatever of any trouble requiring such legislation as this. I did not know of the existence of the wrong that is now claimed is so great as to demand the attention of the law-makers of the state. I never heard of the relief department of the Burlington road, much less of any trouble connected with it, or of wrong growing out of it, and though for the past eight years those alleged grounds of complaint have existed, no railway constituent of mine, nor other person, ever whispered to me that it was an evil that needed correcting by law. It has remained until now to be brought to our attention, not in obedience to a public demand, not because the people of this state in any number, great or small, have in any manner asked for it, nor because the railway employes of the state anywhere had requested it.

I must be opposed to the bill because, in my judgment, its passage will work an irreparable injury to those directly affected thereby. It is designed for the destruction of what is known as the relief department of the Burlington road; or whether so designed, the effect will be the dissolution or compelling its reorganization upon lines greatly impairing its usefulness to its beneficiaries, increasing largely the cost of the protection it may give, materially limit the benefits and otherwise result in disadvantage and loss to its members.

It will not be contended that the Burlington relief department is not a good thing. Indeed, I believe that the candid friends of the Temple amendment will admit that it is an extraordinarily good thing, and in every respect desirable for those engaged in the extra hazardous employment of handling and conducting railroad trains. A glance at its principal features will determine this.

The association for relief purposes is divided into five classes, thus determining the cost to the member and the amount of the benefits he may expect, and in his respective class the beneficiary will receive daily benefits, for disability from sickness, for disability from accident from any cause, whether at his home or on the street, or from his own fault or negligence in connection with his employment as well as when occasioned by the fault of others. The disability benefits are paid in full for one year, and thereafter one-half the maximum sum is paid until disability ceases. While under disability for any cause, he is entitled to and receives, free of cost, hospital treatment, all medical and surgical attendance, and the service of nurses.

While under disability he pays nothing whatever into the relief fund, being wholly relieved from contributing thereto while unable to labor.

He receives a death benefit when death occurs from disease, or from accident at his own home, or on the street, or elsewhere, or from his own fault or negligence in connection with the duties of his employment, as well as when resulting from the fault of others.

When death ensues after a protracted illness, or confinement from injury, the full death benefit is paid, there being no deduction therefrom because of the disability benefits received during such illness or confinement, or of the cost of hospital treatment, medical or surgical attendance, and the services of nurses.

The sum he pays is fixed and certain, there being no possibility of it being increased or additional assessments made upon him. He pays no entrance or initiation fee, no reinstatement fee, and pays no part of the cost of maintaining and operating the department, and there are other advantages of direct benefit to the members of which my limited time will not permit me to speak.

The part of the railway company in this scheme is:

To pay all operating and management expenses of the department so that every dollar of the money contributed by the members is a fund sacredly devoted to their exclusive benefit.

To pay all deficiencies so that in case the benefit fund is not sufficient at any time to meet the demands made upon it, no member is required to increase or make extra contribution.

To guarantee the fidelity of the custodian of the money so that the members are under no burden of apprehension that the trust fund may be lost or impaired through the speculation or rascality of the holder.

Such in brief is the plan and operation of this relief department, a plan by which the men and the company have by a mutual organization, in which the employer and employed share in the contribution of capital employed, creating a benefit association that for actual value to the assured may challenge the world as the most magnificent and munificent scheme of insurance ever devised and put into operation.

The question now occurs, why should this department be destroyed or crippled in its operation? And the answer given us is, because, first, the party who enters this association contracts with the company that in case he is injured in the company's service, through the negligence of its agents, and a cause of action has arisen in favor of the injured against the company, he must, if he receives the insurance benefits, release his claim against the company. And, second, because the men are not free to go in or remain out of the relief department and at the same time be permitted to enter or remain in the company's employ; that the department is a club by which the will and action of the employe is coerced into submission to the will of the corporation in the matter of joining the relief department, and in other direc ions as well.

Concerning the first, I have to say that it is a fact that members of the relief department do agree that when they have a claim against the company for injuries occurring from the negligence of the company's agents, he will release the company from all liability in case the disability or death benefits are accepted by himself or his beneficiary, and herein the company derives in part its share of the benefits of this mutual association. But it is not true that the party injured is compelled to accept such benefits. He may elect to hold the company liable and collect for his injuries therefrom. If he believes the sum he is entitled to have from the company is better than the benefits he is entitled to receive from the department, he may leave the benefits and proceed against the company, but he cannot have both, and as the company has borne its part of the department burdens under the department contract, he ought not in justice to have both.

To the charge of coercion, I have given very earnest and careful attention for I consider it a most important feature of this controversy. If I believed that the men are not free to act as they please in any material matter, I should favor this law, but when it is considered that there are in the employ of the Burlington system over 20,000 men, and but little over 13,000 of them are members of the relief department, it does not appear that the supposed coercion is very effective. It is also shown that during 1896, some over 500 men were taken into the employ of that company and not 200 of them are in the department, so from those facts, as well as from the overwhelming testimony of the men employed by the company, members and non-members of the department, I am satisfied that the charge of coercion in not sustained.

The mutual organization known as the Burlington Relief department is satisfactory to the men and the company, to all those directly affected thereby, and I have no right as a member of this senate, by my vote or otherwise, to enter upon that great family association and destroy it. I should feel, were I to do so, that I have violated my oath of office and proved grossly recreant to the high trust reposed in me as a representative of the great interests of not only my own district, but of the state, inflicting an injury, the extent of which there is now no way of determining.

Senator Healy addressed the senate in the following words:

I have no fear of being misquoted, and have not written out my remarks in order to be sure that they will be satisfactorily reported. We have too large an audience to make it possible for any man to be seriously misrepresented.

I am not as circumspect as the gentleman from Mahaska (Mr. Blanchard), who has prepared a prosy written instrument.

I am not responsible to any corporation or labor organization, whether it be a regular labor union or an organization of scabs.

What is the question involved in the Temple amendment? I will aim to answer it as I understand it. In 1862 the Iowa legislature passed a law making railway companies liable to an employe engaged in the hazardous occupation of operating a train for an injury done such employe by the negligence of his co-employe.

It was new legislation then, and it was good and righteous legislation, and time has proven the wisdom of such enactment.

In 1868 an amendment was passed strengthening its provisions.

In the revision of the Code in 1873, the law as amended was re-enacted. It has been a part of the laws of this state ever since. No decision of the court has weakened the force of this statute until the decision was rendered which upheld the Burlington Voluntary Relief association. It was asserted in that litigation that the Burlington Voluntary Relief association contract was an indirect evasion of the provision of the statute, but the supreme court in an opinion which does not satisfy the judgment of the bar, nor the labor organizations of Iowa, holds that the contract of this association did not constitute an infringement of the statute.

Not until this decision was there a wound inflicted on the fair figure of this beneficent law. The supreme court in its decision inserted the poinard under the fifth rib of the statute, and the Temple amendment seeks to bind and heal the wound thus made.

We are asked to give the same right that has always been held by the employe since the law of 1862 was passed. That is the broad question. It is far more reaching than some of the opponents of the measure seem to apprehend. It involves more interests than the Burlington railway, and far more employes than those of the Burlington system. Every railway employe in Iowa, every wife of such employe, every member of his family, and every citizen who believes in maintaining the integrity of our laws are interested in maintaining the statute passed in 1862, and which is indirectly repealed, if the legislature of Iowa does not cure the decision of the supreme court. In principle, if the Burlington association contract is to be upheld, the railway company has transferred to the defenseless employes the responsibility and the duty which the statute placed upon the company. It takes from the compensation of the employe an exaction, in order that the company may be saved harmless for the pecuniary liability placed upon it by the statute.

Instead of the managing officers and directors of the railway being responsible for the management of the road, for the employment of safe, sober and prudent men, for the use of the most approved appliances, and every other safeguard known to railroading, the decision of the supreme court has transferred this duty and this responsibility to the employe. This is why the employes of the railway systems, and kindred labor organizations are practically a unit in asking this legislature to pass the Temple amendment.

This is the way the matter presents itself to my judgment. No argument nor artifice can seduce me from my sincere conviction that the Temple amendment is one of the most righteous measures presented to this legislature, and should be made a part of our laws. I will never vote for a law which permits the employe, under the stress of his circumstances, and the subjection under which he is naturally held in his relations with the employer, to contract away the statutory liability of the railway company. The Berry amendment seeks to do this. It is indefensible. No one asks it. Even the railways do not ask it. No labor organizations ask it. No railway employe asks it, and yet this senate will deliver to the railway employe and the labor organization, the Berry substitute as an answer to the demand for the Temple amendment.

Young as I am, and although I am not the seventh son of a seventh son, and therefor not gifted with prophecy, I say to you that you will live to see a legislature within four years set in these halls that will say, and will enact its declaration into law, that you can not evade the law of 1862, and do by indirection what the wisdom of the lawmakers then said you could not do directly.

Senator Carpenter, following Senator Healy, said:

I have listened to hear a reason why we should vote for this amendment, and I have failed to hear one, save the suggestion that consciences have been stifled by the lobby in the hotel Savery. All have been heard and what have they told us? The fact is, a blow is aimed at the life of this association. Somebody seeks to destroy it. Who is it? Should we pass this amendment, it means that the road could no longer operate the department, free of cost, for the benefit of its employes. The average expense of operating insurance societies is about 40 per cent. This is a charge which the company now bears, and which the association could not bear. The result must be to destroy the department. Are the employes talking thus? Not one. They seem satisfied. I hold in my hand a monthly sheet issued by this organization, showing almost 1,000 names of beneficiaries of the organization who received in the month of March last $21,000, paid out largely for sick benefits, more than half of it used in this way rather than in payment of death losses.

In replying to the senator from Webster who claims that the C., B. & Q. railway compels applicants for positions on its road to state that they would join the relief association, I wish to say that I hold in my hand one of their printed blanks and there is nothing of the kind contained therein and that the joining of the association is purely voluntary. It is true that the men applying to it for membership might be asked some questions that would be distasteful to the senator from Webster. He might be asked if he were color blind, for instance. The men are not required to join as a condition precedent to their employment. The examination is for the purpose of ascertaining whether the men are in possession of their faculties, as no road could well afford to employ men who were color blind or whose faculties were otherwise impaired, because that would tend to produce accidents and would jeopardize the lives of passengers.

The railway brotherhoods see a chance to destroy a rival organization in this voluntary relief department. What do they offer in place of it? A chance to take out insurance elsewhere, at rates so immensely higher that the men, even if they were not too old to get admission, could not afford to carry it.

It is conceded on both sides that if an accident occurred to an employe, he has the right of election whether he would sue the company for damages or would accept his benefits from the relief association and waive damages, and the only injustice claimed is that after an accident has occurred an adjuster would rush around and importune the man to settle before he had time to consider what his rights were. Adjuster or claim agents could take the same advantage of any man injured, whether he was in or out of the association. The law could not prevent the importunities or overreaching of claim agents, adjuster or lawyers in either case I say that because of the system of examination, the Burlington road has men who are in possession of their faculties. Their firemen are promoted to their engines, having become thoroughly familiar with the road, and as a result they have but few widows along the Burlington road. They kill but few men and accidents are constantly on the decrease.

At this point Senator Garst arose and addressed the senate, favoring the minority report. He spoke as follows:

It has been said that there is no coercion used in connection with this relief department. But I quote from the statement of the superintendent, Mr. Bartlett, before the senate committee. He said that if there was one position to be filled, and ten applicants for it, the man who would enter the relief department would be given the preference Now, that man must have employment. He can get it by entering the relief, and he enters it. I care not for the result on this question, save as to the principle involved. Any citizen should have all the rights that are guaranteed to any other. If this system is carried to its logical end, it means finally a system of peon slavery like that of Mexico As to the argument that the adoption of this amendment will destroy the relief association, I leave it to any lawyer on the floor of this senate, if the obligation of the Burlington road to make this insurance good will not continue, whether the amendment is adopted or no.

Senator Carpenter arose to ask if the senator did not know the company's statement concerning the number of men employed who do not become members of the association. Senator Garst replied that the statement was not germane to the point he was making.

SENATOR CHESHIRE'S SPEECH ON THE TEMPLE AMENDMENT.

I regret very much that the senate is opposed to free and unlimited debate on this question, for it is one of the most important questions before this body at this session. I regard it of sufficient importance to claim the earnest and undivided attention of this general assembly, and, under the ten minute rule, there is no opportunity to even state, much less discuss the question.

Mr. President, section 2002 of McClain's Code was adopted, as has been said, almost forty years ago, making railway companies liable for injuries to their employes, when the party injured did not contribute thereto. That law has been upon the statute books for that great length of time without amendment, except when amended in the interest of the poor, injured railway man who has met with accident while at his post of duty on the train. But in these modern times there has come into this state an organization known as the Burlington Relief association, with its main purpose, so far as the railway company is concerned, to nullify and destroy the statutes of the state of Iowa. I am here to-day, as I was here yesterday, the day before and last week, to contend for the right of contract between persons where they stand in an independent relation one to the other; but I am not here to defend a contract which, in my judgment, is contrary to the statutes of my state, and therefore against public policy, and null and void. When I say that, I am aware of the decision of the supreme court on this question, but the supreme court decided the case upon the record before it, and that record did not disclose facts which are patent to every senator upon this floor. The supreme court found, as it was bound to find from the record before it, that this relief association was purely voluntary, or they, perhaps, would have rendered a different decision. I am here to-day to contend that this contract of the Burlington Relief association is contrary to the spirit and letter of section 2002 of McClain's Code I cannot, in the short time I have, recite all the facts bearing upon this controversy, but I want to read, for the consideration of this senate, the testimony of Mr. Drake, an employe on the "Q" road, who tells how the 2,000 names that the senator from Pottawattamie tells of came into the doors of this senate. He, Drake, says that the officers who controlled the "Q" road *commanded* these men to go into those meetings and adopt resolutions and sign petitions and telegrams protesting against the Temple amendment. Drake was one of the trusted employes of the company, and in his statement before the railway committee of the senate, said: "A week ago Sunday there was a meeting held in Chariton, as Mr Corwin stated. Prior to that time there had been considerable talk as to the object of the Temple amendment, what effect it would have upon us and our families, and when this meeting was called we had an idea what it was called for. I had already at that time made up my mind I was going to have nothing to do with it; that I would stay clear of these things; that I was not in a position to say one way or the other; that I desired to stay in the service of the company, and that I desired to do what they wanted me to. They called upon me about this meeting and insisted that I should be present. I asked to be permitted to stay away, but no, they insisted and I went, and after we got to the place of meeting, it was insisted that I should act as chairman. I acted as chairman and all there was to do was a statement of the object of the meeting by one of the lobbyists in this place (Des Moines) and these resolutions presented and a motion made and seconded and the resolutions passed. There were not a dozen persons present. Gentlemen, I am prepared to say, and I believe I could speak not only my own sentiments, but I could speak the sentiments of nine-tenths, yes, ninety-nine hundredths of the men of Chariton outside of the clerks and officials and foremen, and that class of employes, that they feel that they dare not get up and oppose these resolutions. Now, I want to state further, that a week from that time your lobbyist there, over the signature of no official—there was no official signature there—this request, for the different members of the Burlington relief to sign affidavits, and I think every member in that city on that day was solicited, and I think they got eight or nine affidavits to the effect that the relief was a great and glorious thing to them and they didn't desire to see any legislation affecting it. I think seven or eight or nine signed it. I tell you, gentlemen, a man came to me with tears in his eyes, and said: 'Drake, I would sooner have that right arm taken off than do what I believe to be unjust.' He said further: 'I have a wife and I have got a family of little children depending on me. What shall I do?' I said: If you feel like that, you go and sign it. I tell you that plan has been followed not only in Chariton, but all along the Chicago, Burlington & Quincy system."

I, therefore, answer the senator from Pottawattamie by saying that this is the way the 2,027 names of the members of the Burlington Relief association became signed to these petitions, which have been borne through the doors into this senate chamber by the lobbyists and lackeys of the railway company, according to the testimoney of Drake, one of their trusted men who holds the throttle of one of the company's engines and as a trusted and faithful engineer has in his keeping the lives of those who travel on his train.

The distinguished representative of the people of Lucas county (Mr. Huntley), who holds and honors a seat across the corridor, said there in that room (pointing to the railroad committee room), that he talked with the men of Chariton for over two hours and that in his judgment nine out of ten, who signed the resolution, petitions and telegrams received here, were in favor of the abrogation of the Burlington Relief association, in so far as it prevented them from claiming their rights under the statute, and were in favor of the passage of the Temple amendment. The Hon. R. E. Cook, who honors me with his presence, whom I am now looking in the face, and who represents another county of the state in this assembly, testified before the same committee, that he talked with the men at Red Oak, and that he knew the men who sent these letters and telegrams, down deep in their hearts, said: "For God's sake pass the Temple amendment!" There is where your 2,000 names have come from and that is the manner in which they were obtained, and yet, you thrust them in our faces and say they demand the defeat of the Temple amendment!

Now, Mr. President, the senator from Des Moines (Senator Harper), whom I honor and admire, said he had not heard of any employes in his district that were in favor of the amendment. On March 26th, he introduced a resolution from his county which was from the trainmen of his city, asking for the passage of the Temple amendment. The senator enquires, who is asking for the Temple amendment? I answer him by saying that the 28,000 railroad men of Iowa demand the adoption of the Temple amendment. They are the ones who want it. Ninety-nine hundredths of the men who belong to the Burlington Relief association demand it, according to Drake, and some of them with tears in their eyes. The evidence here satisfies me that the men who belong to the Burlington Relief association in this state, while they signed the resolutions at the direction of the officers of this company, and while they sent petitions and telegrams here at the behest of the officers of this company, yet, deep down in their heart of hearts they say: "For God's sake improve this opportunity to make us free men, and men who are absolutely free! Let it not be said that a contract is to be held over us to take the bread from the mouths of our children, and the right of ourselves or the representatives of our estates to recover lawful and just damages for injuries sustained in the hour of accident and adversity. Let it be enacted that no adjuster of this railroad company can come around in ten days after an accident, and before the extent of our injuries are known, and take from us what is our due."

Senators, these are the considerations which appeal to me, and so help me God, I will do what I can, here and elsewhere, to make these men free!

Senator Waterman followed Senator Cheshire and answering the argument which Cheshire had brought in favor of the Temple amendment in the shape of the testimony of an engineer on the ' Q" road that the men were coerced to join the relief, and were coerced to sign petitions against the Temple amendment, he said this.

same man, Drake, had left the Burlington Relief association several times, and had as many times gone back to it; that he had come to Des Moines and testified before the senate committee, and was still in the employ of the "Q" road. He said that in all his extended acquaintance with Burlington employes he had never found one that opposed the relief association. On the other hand, he had met with many who thought it was a beneficent organization. He declared himself in favor of the Berry substitute, and was of the opinion that no arguments had been presented in favor of the amendment which had any grounds whatever.

Senator Berry next spoke, and said he had made a careful investigation of both sides of the question; had listened to the presentation made to the committee of the reasons why one side favored and the other side opposed the so called "Temple amendment," and had come at last to the conclusion that the right thing to do is to vote for the substitute. That he impugned the motives of no senator who might have reached a different conclusion. He called attention to the various relief associations throughout the United States, and said that in his judgment benefits had accrued to both the railroad companies and the members by their maintenance. He further said:

> I am ready to support the committee substitute and pass the amendment for the reason that there are about four hundred members of the Chicago, Burlington & Quincy Railway Relief association, the only one organized in this state, who cannot get insurance in any of the labor relief associations on account of age, and many more who no doubt would be excluded because of physical disability; to legislate in a way that would strike down this association, which I believe would be the result if this amendment should become a law and be upheld by the courts, would be to take from these men and those dependent upon them protection which they cannot get anywhere else and would be wrong. The only court that ever passed upon the question held a statute similar to the proposed amendment void because repugnant to the constitution of the United States; but this is not controlling with me, for the reason that I think the question of its constitutionality not free from doubt, and a court of last resort may hold a law such as is proposed in this amendment to be constitutional. It seems to me that such legislation is an unconstitutional interference with the right of private contract. The other, however, is the reason that controls my vote to-day. Two thousand and more of our fellow citizens; laboring men, and their families, will be deprived by such legislation of benefits in which they feel secure, growing out of contracts they had voluntarily made and after losing them can find no way of securing relief in any brotherhood organization except a few in the order of railway conductors. This I do not believe is right, and I cannot vote for it. I favor the substitute

offered by the committee because I think the members of the railway association should have at least thirty days in which to recover from the immediate effects of an accident, and investigate and determine as to their rights before being required to elect as to which remedy they will avail themselves of. I believe in organized labor, and believe that it is a necessity, in order that labor may protect itself against organized capital, but I do not believe that as a legislator I will be doing my duty in so voting as to do an injustice to one class of laboring men in order to benefit another class of laboring men.

Several other senators spoke for and against the amendment of which no record could be procured.

SENATOR HOBART, CLOSING SPEECH.

I also was a faithful attendant upon the meetings of the railway committee. I was there and listened attentively. The judgment I formed from the statements made before the committee was entirely different from that formed by the senator from Warren. The senator from Warren maintains the position that there was nothing introduced before that committee that would lead one to believe that coercion was used on the "Q" with reference to the relief department. I think that it was the natural conclusion that could be drawn from the testimony that was introduced and the manner in which it was introduced.

There was one witness about whom the senator from Polk spoke—Mr. Drake—whose testimony to my mind was conclusive upon that question, and when it came to the question of that man's reliability there was no person to question it; not even the officials of the road who were present would do that. They said he was a man worthy of belief. There has not been a word said against his character up to the present time We have heard a portion of his testimony read. I will read another part of it [quotes from Mr. Drake's testimony]: "After I had withdrawn from the Burlington relief the question came up as to whether it would be safe for me not to be a member of the association," etc. There is the evidence of a man whose testimony has not been impeached. The universal sentiment was that they would like to get out of it. "We are coerced," they said, "and it is not a voluntary matter with us."

We have heard much here to-day about the wonderful benefits of this association. It is a pretty good insurance society, but we have others just as good. Why, I have in common with others been solicited by insurance agents, each of whom claimed to have some additional benefits that made his company better than any other company that had preceded him, and so the Burlington relief has something a little different from the other insurance companies.

The question of insurance, as has been stated here, is not the question at issue. We do not want to destroy the Burlington. Let them go on. Let them build their hospitals, and continue in the good work of insuring the men on their road. We do not seek to destroy it, but we do ask to have one little provision in that agreement that will protect the men and their families—that is, where a man must give up his rights into the company's keeping. That is what we say is wrong. We want this association to go on, and it can go on if we strike out this clause in relation to the contract. They say that we want to destroy the organization, when we are not seeking any such thing. The men, in order to hold their employment, must sign what has been termed their death warrant.

Under sections 1306 and 1307 of the Code, a like restriction is imposed on railway companies, and it has been held constitutional. The legislature has the power to say that these unjust contracts shall not be made. It seems to me that the supreme court decision was not right. They have stepped out of their way to approve of this contract. Any single senator is just as competent to decide this question on the facts presented. I say that it is their duty to decide whether that contract is directly against public policy or not.

Labor found that it must organize in order to maintain its rights. They assume the position and theory that railway companies and other corporations furnish the capital and they furnish the labor, and that they are both entitled to a just proportion of the profits. That has been their theory, and labor has finally obtained a hearing. They simply expect and ask for a just share of the profits, and if the adoption of the Temple amendment would only aid in doing this, I see no reason why it should not be adopted. They have not demanded what is unjust. They never have, they never will.

The Temple amendment was an amendment offered by Representative Temple, of Clarke county, to a senate code revision committee bill, known as senate file No. 20, entitled a bill for an act to revise, amend and codify the statutes in relation to the construction and operation of railways. This bill was first introduced in the senate by their code revision committee on January 22, 1897. It was read first and second times and referred to the committee on railways. This committee submitted a report on January 30, recommending several amendments. On February 9th the bill was called up by the chairman of the committee on railroads. On motion of the chairman the bill was read by sections for the purpose of amendments. Several amendments were adopted. When the time for adjournment had arrived the bill was yet incomplete and it went over until the morning session, January 10th, when the bill as amended received a constitutional majority and was declared to have passed the senate.

On February 11th this bill was sent to the house for its consideration. It was read first and second times and referred to committee on railroads and commerce. On February 13th this committee reported favorably on the bill and recommended that it pass the house. February 18th the bill was taken up and considered and the report of the committee adopted. February 19th the reading of the bill was resumed, several amendments being offered by various members of the house, some of them being carried and some of them not being carried. House adjourned without completing the bill. February 20th, further consideration of the bill was had, and it was upon this date that Representative Temple introduced his famous amendment. The amendment was adopted. Upon motion of Representative Lauder, the rule was suspended and the bill considered engrossed and read a third time. On the question shall the bill pass the yeas were 78, the nays were none, the absent or not voting was 22. February 23d the bill was sent back to the senate for consideration of house amendments, and was referred to the senate railroad committee.

March 26th the senate railroad committee reported, recommending that what was known as the Berry substitute be substituted for the Temple amendment, Senators Hobart and Garst submitting a minority report favoring the Temple amendment. On April 8d, by motion senate file No. 20 was made a special order for Wednesday, April 7th, at 10 o'clock A. M. Senator Hobart presented a substitute for the minority report on senate file No. 20, slightly changing the Temple amendment. Wednesday, April 7th, the day set for the special order for the consideration of senate file No. 20 having arrived, Senator Lothrop moved the consideration be postponed until house file No. 18 be disposed of. Carried. No. 18 being disposed of, Senator Penrose called up report of committee on senate file No. 20. Senator Hobart moved to withdraw the minority report formerly introduced by him and offered a substitute therefor. Carried. He then moved that the substitute minority report be substituted for the majority report of the committee on section 88 of the bill. Senator Cheshire moved that the rule limiting speeches in debate to ten minutes, be suspended during the consideration of this section. The motion to suspend was lost. On April 8th the senate resumed consideration of the report of the committee on house amendments to senate file No. 20. Several amendments were offered by various senators, most of which did not carry. Senator Healy moved to insert in line 1, of the Berry substitute, after the word "corporation" the words, "with authority to transact a voluntary insurance or indemnity business under the insurance laws of the state of Iowa." Senator Waterman moved the previous question on the amendment and substitute. On the question shall the main question be put, the yeas were: Senators Alexander, Allyn, Bell, Berry, Blanchard, Bonson, Byers, Carney, Carpenter, Carroll, Craig, Downey, Druet, Ericson, Harper, Healy, Henderson, Hospers, Hotchkiss, Lothrop, Mitchell, Palmer, Perrin, Phelps, Pusey, Ranck, Riggen, Sargent, Trewin, Upton, Waterman—31 The nays were: Senators Cheshire, Eaton, Ellison, Everall, Funk, Garst, Gilbertson, Gorrell, Harriman, Hipwell, Hobart, Hurst, Junkin, Kilburn, Penrose, Rowen—16. Absent or not voting: Senators Ellis, Lehfeldt, Young—3. The previous question was ordered. Several other amendments were offered at this time. The senate then took up other house amendments and concurred or nonconcurred as they saw best. On the question, shall all the amendments recommended by the committee to senate file No. 20 be adopted, the yeas were 33, the nays 13, and those absent or not voting 4. The house amendments were concurred in.

April 9th Senator Carney filed a motion to reconsider the vote by which all the amendments recommended by the committee to senate file No. 20 passed the senate. The motion to reconsider carried and further action was postponed until Wednesday, at 10 o'clock, April 14th. When the day for the special order arrived, Senator Penrose moved that the amendments be divided, and the amendments to section 38 be acted on separately. Motion carried. Senator Penrose moved that a roll call be had on the Berry substitute. On the question, shall the committee amendment to section 38 of senate file No 20 be adopted, the yeas were: Senators Allyn, Bell, Berry, Byers, Carpenter, Carroll, Craig, Downey, Druet, Eaton, Harper, Hipwell, Hurst, Kilburn, Lehfeldt, Lothrop, Mitchell, Palmer, Phelps, Pusey, Ranck, Riggen, Trewin, Upton, Waterman, Young—26. The nays were: Senators Alexander, Bonson, Carney, Cheshire, Ellis, Ellison, Ericson, Everall, Funk, Garst, Gilbertson, Gorrell, Harriman, Healy, Henderson, Hobart, Hospers, Hotchkiss, Junkin, Penrose, Perrin, Rowen, Sargent—23. Absent or not voting: Senator Blanchard.

On April 15th senate file No. 20 was messaged to the house with the information that the senate had concurred in house amendments to sections 22, 36, 42 and 72, but had refused to concur in the house amendments to sections 42 and 45, and that the senate had adopted a substitute for the house amendment to section 38. The amendment to section 38 was the "Temple amendment," and the substitute offered was what was known as the "Berry substitute," both of which have been given in preceding pages of this report.

On motion of Representative Lauder, senate file No. 20 was made a special order for 2 P. M. When the time arrived for the special order Representative Lauder moved that the house recede from its amendments to sections 42 and 45; also, that the house agree to senate amendments to house amendments to section 42. On the question, should the motion prevail, there were 63 yeas, 18 nays, and 19 absent or not voting. So the motion prevailed.

Representative Lauder then moved that the house agree to senate substitute (the Berry substitute for the Temple amendment) for the house amendment to section 38.

On the question, shall the house agree to the senate substitute, the yeas were: Messrs. Bowen, Brighton, Clark, Davis, Edwards, Evans, Garner, Gurley. Hendershot, Hunt, Lauder, McArthur, Manahan, Merriam, Miller of Warren, Morrison of Keokuk, Parker, Prentis, Weaver—19.

The nays were: Messrs. Bailey, Baker, Bell, Bird, Brady, Brant, Brinton, Byington, Chapman, Classen, Cook, Cornwall, Crow, Doubleday, Dowell, Early, Finch, Frazee, Frink, Funk, Good, Grote, Hauger, Hayes, Hinman, Huntley, Jackson, Johnson of Webster, Johnston of Franklin, Klemme, Ladd, Lambert, Lavender, Loomis, Lowry, McAchran, McDonald, McDowell, McQuin, Marti, Martin, Mayne, Miller of Cherokee, Miller of Buena Vista, Morrison of Grundy, Mullin, Nietert, Nolan, Perrott, Porter, Potter, Power, Putnam, Ray, Reed, Scott, Smith, Sullivan, Temple, Thompson, Van Houten, Voelker, Wells, Whelan, Whittier, Williams, Wilson, Mr. Speaker—68.

Absent or not voting: Messrs. Allen, Griswold, Haugen, Hazen, Hinkhouse, Jay, McNulty, Spaulding, St. John, Tibbitts, Watters, Wheeler, Wood—13.

So the house refused to agree to the senate substitute and the senate was so notified.

On April 16th a message was received by the house from the senate to the effect that the senate had refused to recede from its substitute for section 38, and that a conference committee had been appointed by the president of the senate, composed of the following senators: Berry, Palmer, Trewin and Ranck.

On April 19th the speaker of the house appointed as a conference committee from that body Messrs. Temple, Finch, Whelan and Sullivan.

On April 30th this conference committee reported to the senate and house that they were unable to reach an agreement on the

Temple amendment and the Berry substitute, and recommended that another conference committee be appointed.

The speaker of the house, on May 1st, appointed as a second conference committee on the part of the house Messrs. Lauder, Bell, Brighton and Hayes. The senate committee on the second conference consisted of Senators Pusey, Waterman, Lothrop and Harper.

On May 4th this committee reported to their respective bodies that they unanimously recommended that the senate recede from its substitute for the house amendment to section 38 of the bill, and that the house recede from its amendment to said section.

This recommendation was concurred in by the house on May 4th by the following vote:

The yeas were: Messrs. Allen, Baker, Bell, Bird, Bowen, Brant, Brighton, Brinton, Clark, Cornwall, Crow, Davis, Doubleday, Early, Edwards, Evans, Frink, Funk, Garner, Good, Grote, Gurley, Haugen, Hayes, Hendershot, Hinkhouse, Klemme, Lambert, Lauder, Loomis, Lowry, McAchran, McArthur, McDonald, McNulty, Manahan, Martin, Mayne, Merriam, Miller of Buena Vista, Miller of Warren, Morrison of Keokuk, Mullin, Nietert, Parker, Prentis, Reed, Scott, Spaulding, St. John, Thompson, Tibbitts, Van Houten, Watters, Weaver, Whittier, Williams, Wood, Mr. Speaker—59.

The nays were: Messrs. Bailey, Brady, Byington, Chapman, Classen, Cook, Dowell, Finch, Frazee, Hazen, Hinman, Huntley, Jackson, Johnson of Webster, McDowell, McQuin, Marti, Miller of Cherokee, Morrison of Grundy, Nolan, Parrott, Porter, Power, Putnam, Ray, Smith, Sullivan, Temple, Voelker, Wells, Wheeler, Whelan, Wilson—33.

Absent or not voting: Messrs. Griswold, Hauger, Hunt, Jay, Johnston of Franklin, Ladd, Lavender, Potter—8.

So the report of the second conference committee was adopted by the house.

The report of the second conference committee was adopted by the senate upon the same date by the following vote:

The yeas were: Senators Alexander, Allyn, Bell, Berry, Blanchard, Bonson, Carney, Carpenter, Carroll, Craig, Downey, Druet, Ellis, Ericson, Garst, Harper, Henderson, Hipwell, Hotchkiss, Hurst, Kilburn, Palmer, Penrose, Phelps, Pusey, Ranck, Riggen, Sargent, Trewin, Upton, Waterman, Young—32.

The nays were: Senators Cheshire, Ellison, Everall, Funk, Gilbertson, Gorrell, Harriman, Healy, Hobart, Perrin, Rowen —11.

Absent or not voting: Senators Byers, Eaton, Hospers, Junkin, Lehfeldt, Lothrop, Mitchell—7.

Thus, on May 4th, ended the controversy, and the bill, so far as the Temple amendment and the Berry substitute were concerned, remained the same as the old law, the joint committee on enrolled bills reporting the fact on May 8, 1897.

The railroad brotherhoods of the state maintained a joint committee at the state house during the entire session of the general assembly, consisting of H. E. Wills, Clinton; J. A. Brownfield, Des Moines; C. A. Beebe, Mason City, of the B of L. E. Col. J. F. Kingsbury, Clinton; Fred. L. Barnett, Des Moines; Wm. McArdle, Estherville, of the B. of L. F. W. F. Knight, Clinton; A. W. Bell, Marion; G. G. Phillips, Des Moines, of the O. R. C. F. R. Pike, Clinton; E. O. Haven, Waterloo; F. S. Barnes, Creston. of the B. of R. T. In the organization of this committee, H. E. Wills of Clinton was chosen chairman. The manner in which he carried on the work of the committee, presenting the brotherhoods' side of question to the general assembly, and to all others interested, elicited the profoundest respect from every member of the house and senate. The brotherhoods builded better than they knew when they placed H. E. Wills at the throttle. His patience, his untiring energy, his everlasting-stick-to-it-iveness, and the courteous and careful consideration he gave to every phase of the question, stamped him as a man to be trusted at all times and in all places. The entire committee consisted of the very best of men, men who were workers, men who did the work thoroughly and well that was intrusted to them, and the brotherhoods may well feel proud of the men who represented them at the special session.

The following statement was issued about March 1st, as being the brotherhoods' position on the question:

The hearing on next Thursday evening will be largely attended by railroad employes of the state, insisting on the amendment A very full hearing was given on Tuesday and Thursday evenings of last week to the management of the Chicago, Burlington & Quincy railroad, who strenuously opposed this amendment. The matter seems to be of more than passing interest to those concerned, and is said to involve principles of great importance and very far reaching in their effects.

For the purpose of fully understanding the full scope of the amendment, we give the section sought to be amended, which is section 2002 of McClain's Code, and was originally enacted by the Ninth General Assembly. It is as follows: "Every corporation operating a railway shall be liable for the damages sustained by any person, including employes of such corporation, in consequence of the neglect of agents, or by any mismanagement of the engineers or other employes of the corporation, and in consequence of the lawful wrongs, whether of commission or omission of such agents, engineers, or other employes when such wrongs are in a manner connected with the use and operation of any railway on or about which they shall be employed, and no contract which restricts such liability shall be legal or binding."

It will be seen in brief, that the substance of this section is to impose liability upon corporations for any injuries occurring to persons engaged in operating trains, when such injuries occur by reason of negligence, either on the part of the corporation or any of its employes, other than the party injured, and the last clause of the section provides that the corporation shall not make any contract with the employe which shall restrict its liability, or in any manner limit the application of this section. This statute has stood on the books since 1862, and was enacted from motives of a wise public policy. It is a notable fact that the railways of the country draw annually from among the most capable young men of the state, and enlist them in their service. It is the duty of the state to see that they are protected in life and limb, and that their producing power shall not be impaired by any negligence, either in the construction or operation of the railways which they operate.

It has been the experience of the past that cheapness of construction and negligence of operation tends to wastefulness of human life and energy The statistics for the year ending June 30, 1892, show that there were killed on the railroads of the United States during that year 2,554 employes, and that 28,268 were injured, or one for every 322 engaged in that industry was killed and one injured for every twenty-nine men in the employ of the railroads. In the case of trainmen, the statistics for the same year show that the mortality was greater than among the general employes, one being killed out of every 113, and one being injured out of every ten. The accidents were most numerous in the states where railroads are the most cheaply constructed, and are managed the cheapest, and where the law gives the least protection. In the state of Virginia and the Carolinas, one trainman was killed for every thirty-three employed and one injured for every six.

In the middle southern states, where the same conditions obtain, the proportion was equally high. This experience may be said to demonstrate the necessity and absolute wisdom of the statutes above quoted. It is believed that the statute, having remained upon our books for more than a third of a century, has been approved by time and experience, that no one would dare to advocate its repeal.

The burden of paying for the injury of these killed and maimed employes who suffer from the negligence defined in the statute, is imposed upon the railroad companies to insure the proper construction and careful operation of their railways. It is intended that not only shall the railways be constructed and equipped in the best possible manner, but that the railroad company shall be put under bonds to necessitate the carefulness of all its employes. Not only are railroad men interested, but every patron of the road has a like interest. The statute imposes what may appear to be a serious burden, but for a wise and sufficient purpose, and expressly provides, "that no contract which restricts such liability shall be legal or binding." Several of the railroads of the country, and among them the Chicago, Burlington & Quincy, have sought by various devices to accomplish indirectly what they cannot by direct means—that is, to avoid the force and effect of this statute, and so far as the company is concerned, to relieve it from the greater part of the liability thereunder. They have organized what are known as voluntary relief associations, which associations are practically under the control of the railroad companies, in which the railway men are classified into five classes, graded according to their wages as shown upon the pay roll. and the men are required to contribute monthly a sum varying in the different classes from 75 cents per month up to $3 75 per month, which is retained by the company from their wages, and which forms an insurance fund, out of which the employe is paid certain benefits in case of sickness or injury, and in case of death a sum varying from $250 in class 1 to $1.250 in class 5.

This relief work would be unobjectionable, so far as the statute is concerned, were it not for the following provisions contained in the contract: "I also agree. that in consideration of the amounts paid and to be paid by the said company for the maintenance of the relief department, the acceptance of benefits from said relief fund for injury or death, shall operate as a release and satisfaction of all claims or damages against the said company, arising from such injury or death, which could be made by me or my legal representatives." Under this clause the acceptance of any relief bars any action under the provisions of the section above quoted, although the relief or insurance has in large part been paid for by the money of the employe. In fact, it often occurs that the party receives relief without knowledge of the extent of the injury from which he is suffering, and under the belief that the injury is only temporary, when he afterwards discovers that the injury is permanent or may result in death One of the rules of the company made a part of the contract is as follows: "Should a member or his legal representatives bring suit against the company, for damages on account of injury or death of such member, the payment of benefits from the relief fund on account of the same shall not be made until such suit is discontinued, and if such suit shall proceed to judgment or shall be compromised, all claims upon the relief fund for benefits on account of such injury or death shall be thereby precluded."

Thus the company is enabled to practically avoid the provisions of section 2002 and shift the responsibility, in whole or in part, upon the employes, and the courts have construed the law to be that, if the injured employe accepts any small portion of the benefits, it shall be construed as a revocation of the contract theretofore entered into and shall operate as a settlement of the claim for injury, without regard to the inadequacy of the amount received from the relief fund. The alternative is presented to the injured employe of waiving the benefits for which he has paid, or of waiving the injury for which the statute seeks to give him redress. To correct this apparent evasion of the law, the amendment under consideration was offered in the house by the member from Clarke, and is as follows: Add to the section as it now stands, the words, "nor shall any contract of insurance, relief, benefit or indemnity in case of injury or death, nor any other contract entered into prior to the injury between the person so injured and such corporation or any other person or association acting for such corporation, nor shall the acceptance of any such insurance, relief, benefit or indemnity by the person injured, after an injury from such corporation, person or association constitute any bar or defense to any cause of action under the provisions of this chapter."

The object of this amendment is not to destroy relief associations, but to give effect to the statute as it now stands, which is being effectively evaded by the corporations. Those in favor of the amendment do not desire to interfere with the noble work of relief of the sickness, injuries and disabilities of the employes in a manner, but simply to provide that the corporations shall not, by any device, escape the responsibility which a wise public policy has laid upon them for valid and well approved reasons. The impression seems to have gained ground in certain quarters that the amendment would destroy the relief associations. Such is not the case, and cannot be the case unless it be that the railroad companies are maintaining these charitable and humane institutions for the sole consideration that they may avoid the responsibility imposed upon them by the statute, by collecting from their employes a fund and disbursing it among their fellows, under the pretense and guise of charity. If the company will not maintain a relief association, if this amendment should become a law, then no stronger proof can be offered that its acts are false and deceitful, and its sole object is to avoid reliability imposed by the statute on public policy, and to escape a burden which has been laid upon it by a rational discriminating government. It cannot he discharged of the duty imposed upon it by the statute, nor rid itself of the obligation to avoid negligence and the exercise of care in dealing with human life and limb by dispensing charity in case of sickness or unavoidable injuries, much less by acting as manager of a charity whose funds are contributed by the labor of the employes, which could as well be distributed by their own well-known, safely managed, conservative and careful organizations which have resulted from centuries of experienced, conservative organized labor.

It is hoped that the senate will keep in view the point in the case and not be misled by specious pleas of railway managers, corporation counsel, or even pet employes, who, by cajolery in part, and intimidation in part, are brought before the committee to act as the mouthpieces for the managers of corporations.

WHAT THE BURLINGTON VOLUNTARY RELIEF DEPARTMENT IS.

A BRIEF STATEMENT BY J. N. REDFERN, ASSISTANT SUPERINTENDENT OF DEPARTMENT.

The Burlington Relief department was organized in 1889 as a department of the Chicago, Burlington & Quincy Railroad company, and of certain other companies controlled by it, but operated under separate organizations. The scheme of the organization of the department contemplates that it shall be operated with a single management, but that the funds raised from contributions upon each of the roads embraced in the Burlington system shall be a separate fund for the sole benefit of the employes of that particular road.

When the department was organized, all employes were admitted for a time, without regard to age, but since that time no members are admitted who are over 45 years of age, or who are not in good physical health; nor are any members admitted who are not exclusively in the service of some company in the Burlington system. Members are taken and come from all branches of the service, and all who join contribute in like proportion, no distinction being made between different branches of the service.

The regulations of the relief department provide for an advisory committee, of whom one-half are appointed by the railroad companies and the other half are elected by the members, from their own number, upon the associated roads; the general manager of the Chicago, Burlington & Quincy Railroad company is *ex-officio* a member and chairman of the committee. To this committee are referred all disputes of any kind arising between the men and the relief department, and it is also charged with the duty of seeing that the department is administered in accordance with the rules.

Membership in the relief department is purely voluntary. No employe is required to be a member, and any member can withdraw at pleasure, and, having withdrawn, can again become a member if he can then pass the necessary examinations and has not passed the prescribed age. The voluntary character of membership is further shown by the report of the superintendent of the relief department for the year ending December 31, 1896, which states that there were then in the service of the associated roads 21,373 men; of these there were 12,755 members of the relief department, showing that only about 59 per cent of the whole number of the employes of the Burlington system are members. In the year 1896, 516 new men were employed on the Chicago, Burlington & Quincy in Iowa (not including men employed for only short periods of time), of which 159 became members of the relief department, or only about 30 per cent. The total number of men in Iowa who have withdrawn from the department since its organization is eighty-seven. Out of these eighty-seven men, forty-seven are still in the service of the company, showing that continuance of membership is not compulsory.

The membership is divided into five classes, as follows:

CLASS.	Contribution per month.	Benefits per day.	Death benefits.	Additional death benefits can be had, aggregat'g in all.
First	$ .75	$ .50	$ 255.00	$ 1,000.00
Second	1.50	1 00	500 00	2.000 00
Third	2 25	1 50	750 00	3.000 00
Fourth	3.00	2.00	1,000 00	4.000 00
Fifth	3.75	2 50	1.250 00	5,000 00

All dues collected from members are set apart in the relief fund, and can only be used in the payment of benefits. The cost of the administration of the department, including salaries of all officers, medical examiners, office rent, etc., are paid by the associated railroad companies. Besides this, the railroad companies furnish services of employes of other departments, mail, express, telegraph and other facilities free of charge. The whole expense of administration of the department is, therefore, borne by the railroad companies. In addition to all this, the companies guarantee that the fund shall be sufficient to pay all benefits accruing to the members, and in case of any deficiency the companies must make it good; they also agree to pay interest on balances left in their hands. In practice the companies have contributed $42,532.94 to make good deficiency in relief fund, so that (including the undistributed balance which belongs to the members), the members have not only received back from the department, without any deduction for expenses (which expenses of operation have cost the railroad companies in cash and services about $700,000) every dollar they have paid in, but in addition they have been repaid $42,532.94 more than the whole sum paid in by them

The contributions by the railroad companies, from organization of the department to the 31st day of December, 1896, were, in cash, $42,532 94 to make up deficiency in benefit fund; $388,331 56 to pay salaries and office expenses; other expenses and services, estimated, $309,400; total, $740,264.50, to which, if you choose to add interest paid by the companies, $11,672.24, would make $751,936.74.

Benefits are paid in cases of disability from sickness, disability from injury, and death from any cause. The disability benefits are as heretofore shown, for the lowest class, 50 cents a day, and for the highest class, $2 50 a day. In case of disability from sickness, benefits are paid for an aggregate not exceeding fifty-two weeks, after which sick benefits are no longer paid; in case of injury, disability benefits are paid during disability at the full rate for fifty-two weeks, and thereafter during the disability at half-rates, and also bills for surgical and hospital attention and nursing. Benefits are paid in all cases of disability from sickness or injury, except where the sickness or injury results from the vicious act of the sick or injured person; in case of death, benefits are paid according to the discretion of the member in his lifetime.

The following is a brief statement of the operation of the Burlington Voluntary Relief department up to December 31, 1896:

RECEIPTS.

Contributions from members		$1,749,199.73
Interest paid by railroad companies on monthly balances		11,672.24
CONTRIBUTIONS BY RAILROAD COMPANIES:		
To make up deficiencies in benefit fund	$ 42,532.94	
Salaries of officers, medical examiners, and expenses (x)	388,331 56	
Other expenses and services, estimated (x)	309,400.00	
Total paid by railroad companies		740,264 50
Total receipts from members and railroad companies		$2,501,136.47

EXPENDITURES.

Paid in benefits for sickness and death from sickness	$ 768,755.50	
Paid in benefits for accidents and death from accidents	846,009.75	
Total benefits paid		$1,614,765.25
Operating expenses as shown above (x)	388,331 56 309,400 00	697,731.56
Balance on hand in relief fund, December 31, 1896		188,639 66
Total		$2,501,136.47

It appears from this that there was $188,639.66 in the relief fund December 31, 1896. Outstanding on that date were unpresented benefit orders and other maturing liabilities which, if taken out, would reduce this balance to about $112,000

This surplus and any future surplus can, however, be used only in the payment of benefits, and so belongs to the members, and the fact that there is a surplus does not mean either that the relief is self-sustaining, or that the railroad companies are making money out of the men who join it. On the contrary, the truth is that if the operating expenses of the relief had not been paid by the companies, but had been charged against the relief fund, that fund would show as of date Desember 31, 1896, a cash deficit of about $550,000 and outstanding and maturing liabilities of about $75,000, or a total deficiency of about $625,000. The term surplus as used in our reports means only that there is a balance in the relief fund applicable to the payment of benefits, and not that the net operations of the relief department show a profit This balance may be needed for the payment of benefits at any time if epidemic or other cause should increase the proportion of members disabled, and it is desirable that an adequate balance be retained on hand to provide for such emergencies. The railroad companies pay interest on monthly balances, and this interest is added to the relief fund, applicable, as already said, only to the payment of benefits. The liability of the companies to pay all other expenses besides benefits, and to also pay any deficit, is not in any way affected by the fact that there is a surplus, nor by the amount of that surplus.

The regulations provide that in case of accident to a member while in the service of the company, the acceptance of benefits by the member shall discharge the company from liability for that particular accident only, the right to sue and recover for subsequent injuries remaining unimpaired. The injured man is not limited in the time within which he must make his election; he can take as much time as he wants, and, when he has made up his mind, may receive the benefits and release the company, or may refuse his benefits and sue the company. If he refuses his benefits and elects to sue, the rejected benefits remain in the fund for the benefit of the other members, and do not go to the companies. It is objected to this by the friends of the Temple amendment, that the member, having paid for his insurance, is entitled to it when injury occurs, and that he ought not to be required to waive his right of action against the company in order to secure benefits for which he has paid. Whatever might be said about this, if the member paid for all of his insurance, the argument is not sound, in view of the fact, as already stated, that the member does not pay for all of the insurance, but that the railroad companies have paid in cash and services about 44 per cent of the amount paid in benefits to members. This release clause in the regulations is the only regulation securing to the companies any return for what they pay into the relief department for the benefit of the members. To require the companies to give this up would result in one of two things—either the department would be compelled to largely increase the dues paid by the members, so as to cover the whole cost of the insurance, or the companies would have to abandon the plan of co-operative relief, since it is evident that there would be no co-operation if the companies received no return whatever for their expenditure in this behalf. The cases in which a member would need to make such election would obviously be comparatively few. In all cases of death or disability from sickness, and in the large majority of cases of death or disability the result of accident, no question of the liability of the company can arise. In 1896 there were 5,324 cases of disability and death from sickness, as against 3,094 cases of disability and death from accident.

It is also frequently claimed by advocates of the Temple amendment that when a man enters the department he is required to sign an agreement relinquishing some right. The agreement made on entering the department does not in the least restrict or surrender any right which the member might otherwise have, and the supreme court of Iowa in the case of Donald v. Chicago, Burlington & Quincy has so held; on the contrary, it greatly enlarges instead of limits the member's rights and privileges.

Since the organization of the department, the average number of accidental injuries has decreased from 17 per 1,000 members in 1889 to 12 per 1,000 members in 1896, and the average death rate from accident from 6 8 per 1,000 members in 1889 to 1.8 per 1,000 members in 1896. These figures are significant, in view of the assertions sometimes made by advocates of the Temple amendment that it is against public policy to permit the railroad companies to maintain the relief department, because it is claimed the department as maintained tends to reduce the incentive to care on the part of the companies in the operation of the road. These figures are also significant as showing the diminished amount of human suffering and misery, in no small part due to the increased efficiency of the men in the service, the result of the high physical standard established through the operation of the relief department.

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UNITED STATES
DEPARTMENT OF AGRICULTURE,
WEATHER BUREAU.

ANNUAL REPORT

OF THE

Iowa Weather and Crop Service

FOR THE YEAR 1896.

JOHN R. SAGE,
Director.

GEO. M. CHAPPEL, M. D.
Local Forecast Official, U. S. Weather Bureau,
Assistant Director.

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STATE OF IOWA,
OFFICE OF THE WEATHER AND CROP SERVICE,
DES MOINES, April 15, 1897.

To His Excellency, Francis M. Drake, Governor of Iowa:

SIR—In accordance with the requirements of the law, we have the honor to submit herewith the seventh annual report of the Iowa Weather and Crop service for the year 1896. We are, sir, very respectfully, Your obedient servants,

JOHN R. SAGE,
Director.

GEO. M. CHAPPEL, M. D.,
Local Forecast Official, U. S. Weather Bureau,
Assistant Director.

ANNUAL REPORT, 1896.

This service has made a steady and substantial growth during the year covered by this report; and there has been a very gratifying increase in the public interest in relation to the scientific and economic data collected and tabulated by the aid of the efficient and public spirited corps of meteorological observers and crop correspondents, whose fidelity is gratefully acknowledged and appreciated.

This is an age of statistics, and the value of reliable data of the climatic conditions and crop productions of any portion of our great country is recognized by scientists, statesmen and business men of all classes. In this leading agricultural state we are making progress, both in the scientific study of the climate and in a practical knowledge of the almost limitless resources of crop production of our fertile soil.

By the co-operation of the State Weather and Crop Service and the National Weather Bureau the results achieved are much more valuable than could be secured without such unity in the work. The efficient chief of the U. S. Weather Bureau, Prof. Willis L. Moore, has placed the officers of the state service and the people of Iowa under heavy obligations by making every effort in his power to disseminate the daily forecasts to all localities that may be reached by wire or mail. At this time the number of forecasts sent to Iowa postoffices by mail exceeds 1,000; and by telegraph 108 places are recipients of these benefits. Many of these towns served by wire are distributing stations whence postal cards are sent to the towns that may be served by earlier mails.

There is a steadily increasing demand for copies of the Monthly Review and the Weekly Weather Crop Bulletins issued by this service. During the year the number of copies of the Review amounted to over 30,000; and the issue of Bulletins was about 2,200 per week, from April to October.

The records of the local stations of this service have been called into courts quite frequently as evidence in the trial of cases wherein questions of fact arise in relation to meteorological conditions on certain dates or specified times. In many instances the testimony thus obtained from these official figures and notes, made by trained observers by the aid of the best instruments obtainable, have been found to be of inestimable value.

There are connected with this service 123 meteorological stations, of which number 116 report temperature and rainfall, and 7 rainfall only. The observers at 77 of these stations are supplied wholly or in part by state instruments.

METEOROLOGICAL STATIONS AND OBSERVERS.

STATIONS.	OBSERVERS.	STATIONS.	OBSERVERS.
Adair	F. L. Morrison.	Keosauqua	Prof. J. H. Landes.
Afton	Hon. N. W. Rowell.	Knoxville	Casey and Beaver.
Algona	C. D. Pettibone.	Le Claire	River Observer.
Alta	D. E. Hadden.	Lansing	G. H. Markley.
Alta (near)	W. J. Minard.	Larchwood	E. W. Stokes.
Amana	Conrad Schadt.	Larrabee	H. B. Strever.
Ames	Exp. Station.	Lenox	J. L. Hurley.
Atlantic	J. W. Love.	Le Mars	Dr. T. E. Cole.
Atlantic	Geo. W. Franklin.	Linn Grove (Mt. Vernon)	Rev. J. W. Hubbard.
Audubon	F. P. Hocker.	Logan	Mrs. M. B. Stern.
Belknap	A. W. Rankin.	Malvern	R. F. Norton.
Belle Plaine	S. P. Vandike.	Maquoketa	Dr. A. B. Bowen
Bonaparte	Hon. B. R. Vale.	Mason City	H. I. Smith.
Britt	G. P. Hardwick.	Marshalltown	C. M. Cook.
Carroll	Moses Simon.	Maxon (Albia)	Gus Johnson.
Cedar Falls	Prof. A. C. Page.	Millman	W. H. Shaul.
Cedar Rapids	Elec. Light & Power Co.	Mooar	F. G. Thomas.
Centerville	Prof. H. E. Reister.	Monticello	Henry D. Smith.
Chariton	Hon S. H. Mallory.	Mt. Vernon	Prof. A. Collin.
Charles City	J. W. Smith.	Mt. Ayr	J. W. Beard
Clarinda	A. S. Van Sandt.	Mt. Pleasant	Dr. Max E. Witte.
Clinton	Luke Roberts.	Neola	J. H. Garland, Jr.
College Springs	Prof. H. K. Holcomb.	New Hampton	C. L. Gabrilson.
Corning	John W. Bixby.	Newton	A. Lufkin.
Council Bluffs	J. B. Rishel.	Northwood	A. L. Thompson.
Cresco	Gregory Marshall.	Odebolt	E. Starner.
Davenport	*F. J. Walz.	Ogden	E. Sayre.
Delaware	Wm. Ball.	Omaha, Neb	*L. A. Welch.
Decorah	F. H. Baker.	Osceola	A. W. Lewis.
Denison	Wm. A. McHenry.	Ovid	H. C. Miller.
Des Moines	*Geo. M. Chappel, M. D.	Osage	G. D. Pattingill.
Dows	R. E. Fuller.	Oskaloosa	Jos. Boyd.
Dubuque	*L. M. Tarr.	Ottumwa	L. J. Baker.
Eldora	Prof. C. F. Woodward.	Plover	J. S. Smith.
Elkader	Chas. Reinecke.	Portsmouth	J. W. Dahlheimer.
Estherville	M. L. Archer.	Primghar	E. S. Proper.
Fairfield	Charles J. Fulton.	Red Oak	Geo. W. Holt.
Fayette	R. Z. Latimer.	Reinbeck	Dr. L. B. Hathaway.
Ft. Madison	Miss L. A. McCready.	Rock Rapids	W. C. Wyckoff.
Fonda	Chas. F. Linnan.	Rockwell City	Prof. G. B. Rigg.
Forest City	J. A. Peters.	St. Charles	R. D. Minard.
Fredericksburg	C. E. Wright.	Scranton	N. C. Nelson.
Galva	W. A. Crowley.	Seymour	Mrs. C. A. Conger.
Garden Grove	M. Wemple.	Sibley	H. G. Doolittle.
Gladbrook	Geo. F. Parker.	Sidney	G. V. Swearingen.
Glenwood	J. P. Jackson.	Sigourney	Prof. E. H. Griffin.
Grand Meadow, (Postville)	F. L. Williams.	Sioux City	*U. G. Pursell.
Greene	J. L. Cole.	Sac City	Dr. C. Brown.
Greenfield	J. G. Culver.	Spencer	S. Gillespie.
Grinnell	Prof S. J. Buck.	Spirit Lake	W. C. Drummond.
Grundy Center	Geo F. Ellis.	Stuart	J. C. Pugh.
Guthrie Center	W. T. Anderson.	Toledo	Chas. Mason.
Hampton	E. C. Grenelle.	Vinton	T. F. McCune.
Hawkeye	Miss I. Whorley.	Villisca	H. C. Stoddard.
Hopeville	M. T. Ashley.	Washington	Wm. A. Cook.
Humboldt	H. S. Wells.	Waterloo	M. L. Newton.
Independence	E. F. Wulfke.	Waverly	H. S. Hoover.
Indianola	Prof. J. L. Tilton.	Waukee	N. C. Wragg.
Iowa City	Prof. A. A. Veblen.	Webster City	Louis Frank.
Iowa City	Mrs. C. M. Hobby.	Wilton Junction	J. M. Rider.
Iowa Falls	J B. Parmelee.	Winterset	W. W. McKnight.
Keokuk	*Fred. Z. Gosewisch.	West Bend	Phil. Dorweiler.

* U. S. Weather Bureau.

WEATHER CROP OBSERVERS.

STATIONS.	OBSERVERS.	STATIONS.	OBSERVERS.
Agency	J. H. Van Zant.	Le Mars	Hon. Henry Schrooten.
Albia	Wm. Mercer.	Lawler	Hon. Wm Glattly.
Alta	Jonas Cushman.	Lockridge	John F. Farman.
Ames	C. D. Reed.	Marshalltown	Hon. S. B. Packard.
Atwood	J. H. Tanner.	Mason City	Wm. Nettleton.
Battle Creek	A. Preston.	Mapleton	A. Lamb.
Boone	L. C. Morris.	Mt. Pleasant	W. S. Wright.
Bristow	G. W. Wells.	Milton	Hon. E. C. Holland.
Centerville	Henry Galley.	Mount Vernon	Robert Smith.
Charles City	W. B. Towner.	North English	J. L. Williams.
Chariton	C. C. Burr.	Nevada	Geo. C. White.
Clarksville	F. M. Russell.	Osage	E. W. Stacy.
Correctionville	Hon. W. B. Chapman.	Orange City	H. J. VandeWaa.
Corning	Jerome Smith.	Paton	A. B. Condit.
Clermont	Chas. Larrabee.	Pittsburg	G. C. Duffield.
Council Bluffs	L. Prouty.	Rock Rapids	D. E. F. Merrill.
Creston	M. V. Ashby.	Rockwell City	J. G. Palmer.
Danville	Sherman Matthews.	Rossville	T. B. Wiley.
Emerson	D. B. Nims.	Ruthven	F. W. Teed.
Ely	Hon. A. J. Fuhrmeister.	Sageville	Hon. F. N. Knoll.
Fulton	Carl S. Frank.	Seymour	L. B. Sager.
Fontanelle	Hon. L. M. Kilburn.	Shenandoah	Reuben Mullison.
Ford	J. C. Richards.	South Amana	John Cownie.
Fort Dodge	R. W. Blaine.	State Center	E. P. Thompson.
Geneva	Wm. H. Thompson.	Sumner	John Dawson.
Grinnell	A. C. Price.	Tama	W. G. Malin.
Guthrie Center	W. W. Bailey.	Unity	Edw. Hummer.
Hesper	G. E. Dillingham.	Van Horne	Spencer Smith.
Hodge	James Piper.	Washta	H. L. Felter.
Humeston	Hon. S. H. Moore.	Willow Creek	W. S. Nicholson.
Independence	C. L. Thomas.	Winterset	H. A. Kinsman.
Indianola	T. B. Hammer.	Wall Lake	T. E. Wilcox.
Jefferson	S. M. Taylor.	Wilton	Thos. Boot.
Knoxville	G. W. Mendenhall.	West Union	J. W. Bopp.
Larrabee	H. H. Carnahan.		

METEOROLOGICAL SUMMARY FOR 1896.

Atmospheric Pressure.—Mean atmospheric pressure for the year, 30.05 inches. The highest pressure recorded at any station was 30.90 inches, on January 3d, at Clarinda and Omaha; and at Cresco November 30th. The lowest observed was 29.12 inches, on March 28th, at Sioux City. The range for the state was 1.78 inches.

Temperature.—The mean temperature for the year was 48.5°, which is about 2° above the annual average. The highest mean reported was 53°, at Keokuk, and the lowest 41.2°, at Sioux City. The maximum temperature reported was 104°, at Malvern, Estherville and Madrid, on July 3d, and the same extreme at same places August 7th. The minimum for the year was 20° below zero, on January 4th, at Cresco. The range for the state was 124°.

Precipitation.—Average for the year, 37.45 inches, 2.57 inches above the state normal. The highest total recorded was 51.60 inches, at Waterloo. Davenport and Primghar reported the lowest amount—28.68 inches.

Wind and Weather.—Prevailing direction of wind, northwest; highest velocity, 60 miles an hour, at Davenport, May 16th. Average daily wind movement, 191 miles. There were 145 clear, 105 cloudy and 161 partly cloudy days. Rain fell at some point in the state on 86 days.

RELATIVE HUMIDITY.

For the purpose of study and comparison we give below some figures showing the mean relative humidity of the air at the central station at

Des Moines for the six crop months (April 1st to October 1st) in the years 1894 and 1896. The season of 1894 was phenomenally dry, especially during the crop growing months of May, June, July and August. The season of 1896 was unusually wet, with more than normal amount of cloudiness. The following table gives the mean monthly humidity for the two seasons, expressed in percentages:

MONTHS.	1894.	1896.
April	63.7	62.6
May	54.6	69.1
June	54.6	66.9
July	45.8	69.5
August	55.9	72.6
September	69.1	76.8
Means	57.2	69.5

Here we note a difference of 12 per cent in the mean relative humidity of these two seasons. For the four crop months, May to August, the mean in 1894 was 52.7 per cent, and in 1896 it was 69.5 per cent, a difference of about 17 per cent. During the month of July, 1894, the humidity measured only 45 per cent, and there were many days when the evening observations showed from 15 to 30 per cent of relative humidity. In July, 1896, the average was about 70 per cent, and there were some days when the maximum reached very near to the point of saturation.

In 1894 the air was so dry that the dew point was very near the line of freezing temperature, while in 1896 the percentage of humidity was so high that rainfall resulted from a slight fall of the temperature.

The year 1896 is notable from the fact that the fall months were excessively damp, cloudy and cool. It was a year without an Indian summer, which is a rare occurrence in this region.

MONTHLY SUMMARIES FOR 1896.

JANUARY.

The month was usually mild and pleasant. The mean temperature for the state was 23.4°, which is 7° above the January normal. The coldest period was from the 1st to the 5th, and the lowest recorded temperature in the state was 20° below zero, at Cresco, on the 4th.

The average precipitation was .48 of an inch—.9 of an inch below normal. The least amount reported was a trace, at Denison and Rock Rapids; the greatest amount 2.10 inches, at Seymour.

There were 10 clear days, 11 cloudy, and 10 partly cloudy. The highest atmospheric pressure of the year, 30.90 inches, occurred on the 3d, at Clarinda and Omaha.

FEBRUARY.

The month was unusually warm and pleasant, and notably free from violent storms and the extremes incident to midwinter in this midland region.

The monthly mean temperature for the state, as reported by ninety-two observers, was 27.4°, which is about 5° above the February normal. The highest reported was 78°, at Glenwood and Omaha, on the 26th; lowest, 13° below zero, at Cresco, on the 20th, and Wilton, on the 17th. During the past twenty-five years there have been six warmer Februarys.

The average precipitation was .71 of an inch. Ottumwa reported the largest amount, 2.40 inches; least amount, .04 of an inch, at Spencer. There were 12 clear days, and more than the average amount of sunshine.

OBSERVERS' NOTES.

Bonaparte—HON. B. R. VALE: The winter's frost practically out of the ground. A mild, pleasant and profitable month.

Chariton—HON. S. H. MALLORY: Roads have been good all the month except the last week.

Clarinda—A. S. VAN SANDT: A warm, dry month. A good deal of ground plowed during the last week.

Clinton—Dr. LUKE ROBERTS: Thirteen days of fair sleighing during the month. The windstorm of the 18th amounted to a blizzard, as the snow lying on the ground was lifted and drifted about most fantastically, and it was accompanied by a liberal supply of sand and dirt which the 30-mile wind had gathered.

Elkader—CHARLES REINECKE: Ice broke and went out in Turkey river on the 25th.

Emmetsburg—J. H. CARMICHAEL: Dust and sandstorm on the 18th; geese and ducks flying north on the 14th; meadow larks seen on the 28th.

MARCH.

The month of March was cool and dry. The mean temperature for the state was 30 9°, which is about 1° below the normal, The highest temperature reported was 81°, at Belknap, on the 30th; lowest, 12° below zero, at Rock Rapids, on the 13th.

The average precipitation, as shown by reports from ninety-nine stations, was 1.10 inches, which is .97 of an inch below normal. Sidney reports the largest amount, 3.99 inches, least amount, .16 of an inch, at Keosauqua.

The worst storms of the month were duststorms, which were quite severe in many localities. There were 12 clear days, 10 cloudy and 9 partly cloudy.

OBSERVERS' NOTES.

Belle Plaine—S. P. VANDIKE: Duststorm on 21st, continuing all day, restricting the range of vision to a few rods.

Bonaparte—HON. B. R. VALE: A dry, windy month. Farm work began on 23d. Soil very dry. Only about one-fourth the usual rainfall for the month.

Charles City—J. W. SMITH: A great amount of dust in the air, on windy days, from the 18th to the 26th. On the 21st the sun was almost obscured by the dust. On the 30th was another dark day, followed by rain and thunderstorm.

Corning—J. W. BIXBY: Heavy thunderstorm on evening of the 27th, the first of the year. Thermometer fell 40° in six hours on the 31st.

Dows—R. E. Fuller: Very high wind, with clouds of dust, on the 21st. First thunderstorm of the year on the 27th, with hail; another of the same sort on the 31st.

Clinton—Dr Luke Roberts: March, 1896, did not depart materially from the characteristics of the first spring month. Most of the conditions were near normal.

The mean temperature of the month was 32.4°; the highest temperature, 69°, date 31st; lowest temperature, 5° above zero, date 13th; coldest day, 13.7°, date 12th; rainfall, 95 of an inch; number of storm days, 7; number of cloudy days, 9; number of clear days, 11; per cent of cloudiness, 46; prevailing direction of wind, northwest; maximum velocity, 22 miles an hour, date 21st; total movement of wind, 5,500 miles. The greatest March movement of wind during the last fifteen years was 8,330 miles, occurring in 1882.

APRIL.

The noteworthy features of the month of April were abnormally high temperature and excessive rainfall—a combination rarely experienced so early in the season. The mean temperature for the state was 54.5°, which is 6.5° above the normal. The first decade was unseasonably cold, the records of the central station showing an accumulated deficiency of 51° (below normal) on the 9th; but at the close of the month there was an excess of 166°, an average daily excess of 5.5° for the full month. The last freeze was noted on the morning of the 10th, after which date there were no killing frosts observed in the state. It was the warmest April, on the average, ever known in this state since the stations of observation have been established; and it was also one of the wettest Aprils on record.

The average precipitation for the state was 5.02 inches, which amount is 2.42 inches above the April normal in Iowa. The distribution was more nearly equal than usual, all parts of the state receiving ample moisture to serve the present needs of vegetation. The highest amount reported was 9.67 inches at Cedar Falls, and the lowest, 2.35 inches at Keokuk. Distributed by districts the averages were about as follows: Northeast district, 6.02; North Central, 6 01; Northwest, 5 78; West Central, 6.30; Central, 5.20; East Central, 5.70; Southeast, 4.10; South Central, 3.40, and Southwest, 3.45 inches. A considerable portion of the precipitation that fell in the first decade was in the form of snow, sleet and hail.

The high temperature and frequent showers of the second and third decades of the month pushed vegetation forward at an unusual pace, and at the close the season was rated as ten days earlier than the average of recent years. It was a notably favorable month for farm work and growth of crops.

OBSERVERS' NOTES.

Alta—David E. Hadden: On April 7th, from 5 to 7 o'clock P. M., a very heavy thunderstorm, accompanied by high wind, hail, sleet and snow, and followed by heavy rain, prevailed. Hail and sleet drifted from six to eight inches deep in places. Lightning was intensely vivid and sharp, and struck several telephone poles near town; the storm was a phenomenal one for the time of year. Another heavy rain, with sleet, occurred on the 8th, from 3 to 7 o'clock P. M.

Clinton—DR. LUKE ROBERTS: My memory does not recall an April during the last two decades in which so many meteorological conditions seemed more happily combined and seasonable, than those credited to April, 1896.

The mean temperature was 56.5°, or 7.4° above normal. Not only this, but it was the warmest April in eighteen years by 3.2°. April, 1881, was the cold April, recording a mean of 42.7°, giving a range of temperature of 13.8°.

The cold period of the month was from the 1st to the 10th; the last freeze occurring on the latter date. After this, on the 22d, there was one light frost.

Total precipitation for the month was 4 33 inches This is 1.33 inches above normal. There was thunder and lightning on seven different days, but mostly mild — no damage reported.

Bonaparte—HON. B. R. VALE: A seasonable month, very like that of 1895, only warmer. Rainfall for March and April this year exceeds same period last year by .08 of an inch — nothing to brag on.

Corning— J. W. BIXBY: There were eight thunderstorms during April, but none of much severity. Fine growing weather.

Grand Meadow, Clayton County—F. L. WILLIAMS: Rainfall, 6 32 inches — the heaviest for any April in fifty years. In 1856 the amount was 5 inches. Springs and wells beginning to run.

Grundy Center—GEO. F. ELLIS: Good feed in pastures April 10th.

Humboldt—H S. WELLS: This season beats last year in every way. Fruit in full bloom. Work well along.

Iowa Falls— J. B. PARMELEE: Sixth, sowing wheat; 13th, seeding' begins in earnest; 16th, making garden; 20th, plowing for corn begun; 27th, plum blossoms; 28th, apple blossoms.

MAY.

The month was characterized by the prevalence of low atmospheric pressure, high temperature, excessive rainfall and severe local windstorms.

The mean temperature for the state, as deduced from ninety-nine stations, was 65.5°, which is 5 8° above normal. It was the warmest May since 1881, according to the records of the United States Weather Bureau stations within the state.

The average rainfall for the state, as shown from records of 107 stations, was 6.69 inches—2.54 inches above normal. The highest measurement was reported from Mt. Ayr—11.79 inches. All parts of the state suffered to some extent from excess of moisture. The bulk of the rainfall came in the second decade of the month.

OBSERVERS' NOTES.

Amana—C. SCHADT: During the thunderstorm on the 23d, 1.70 inches of rain fell in twenty minutes, and 1.94 inches in fifty-five minutes.

Bonaparte—HON. B R. VALE: Exceedingly wet since the 12th; 7.54 inches of rain, the greatest monthly precipitation for five years. No farm work done since the 12th.

Toledo—CHARLES MASON: The total precipitation for the two months, April and May, is 11 08 inches, and for the year up to the present time is 12.62 inches. The general outlook for crops is splendid

Onawa—C. G. PERKINS: Following are the records of precipitation at Onawa from January 1st to June 1st, 1896: January, .30; February, .28; March, 1 34; April, 6.18; May, 7.34. Total for the five months, 15 44 inches. The average for this period in the last seventeen years is 11 34 inches.

MAY'S DESTRUCTIVE STORMS.

[From Monthly Review, May, 1896]

The meteorological pendulum, in swinging from the extreme of drouth to the opposite extreme of excessive rainfall, brought the usual accompaniment of elemental disturbance. The reaction, as was to be expected, caused numerous violent local storms, involving sad losses of life and property.

This great interior valley is irrigated by cyclonic storms which must needs be produced by a vast expenditure of nature's energies. These cyclones are as essential as sunshine to the life, health and prosperity of this region, and though the gigantic forces employed in the production of cyclonic movements sometimes cause violent action of the elements, yet the good resulting therefrom immeasurably exceeds the incidental ill.

The month of May, 1896, has been made historic by its unusual number of violent local storms, involving considerable loss of life and destruction of property amounting to millions of dollars. These more violent disturbances have occurred within a wide belt extending from near the Gulf of Mexico to Lake Huron, involving portions of Texas, Oklahoma, Kansas, Nebraska, Missouri, Iowa, Illinois and Michigan, with considerable excess of force in a number of states eastward of this belt. Iowa has suffered quite severely, though the life and property losses have been much less than in a number of other states

THE STORM OF MAY 24TH.

The most disastrous windstorm of the month in this state occurred on the night of Sunday, May 24, and the worst effects were produced in Polk, Jasper, Delaware and Clayton counties.

That day was one long to be remembered by those who took note of the meteorological conditions. The remark was frequently heard, "This is a genuine cyclone breeder." The wind was southerly, the temperature of the day being considerably above normal, with a high percentage of humidity and increasing cloudiness.

The weather map on the morning of the 24th showed a "low," or cyclone, advancing from the northwest. The evening map indicated that the low had advanced rapidly during the day, and was then central in South Dakota, Iowa being in the southeast quadrant of the depressed area.

At the Des Moines station the air seemed unusually oppressive, with high "sensible temperature," and with the approach of nightfall the western heavens became murky with advancing storm clouds. At about 9 P. M. a very heavy and threatening bank of cloud appeared in the northwest, coming rapidly toward the southeast, apparently moving directly toward this city. The flashes of lightning were vivid and almost incessant, and, as the cloud approached, the sound of thunder was continuous, varied only by frequent louder crashes and crackling of the electric fluid. Scuds of clouds and some heavy masses of cumulus were observed moving with unusual rapidity from the south and southwest toward the vortex of the coming storm. In fact, the visible masses of vapor from all points appeared to be drawn irresistibly to the center of the storm, as puffs of smoke are drawn toward the funnel of a chimney.

An apparent change was then noted in the direction of the storm, its course being deflected toward the east and northeast. The central shaft of disturbance passed within six miles of the northern limit of Des Moines, and its swiftness of movement was noted when it reached a point directly north of the city. The characteristic roar of the tornado was heard by hundreds of observers who closely watched the awful spectacle. The sound was easily distinguished from the frequent peals and crashes of thunder, being continuous and resembling the noise of heavy trains on a distant railway. Those who noted the passing of that storm and heard its peculiar roar were strongly impressed by the belief that the next morning would bring news of disastrous effects along its pathway from west to east; and the result more than justified their fears.

The character of the storm was made evident by observations at points where the greatest destruction was wrought. The people who resided in or near its pathway say that heavy rain and sharp lightning preceded the windstorm, which lasted but a few moments.

The records of the insurance offices of this city, wherein losses by wind are covered, show that the storm began its work of destruction southwest of Woodward. The first complete loss occurred in section 31, Des Moines township, Dallas county, where the barns and residence of a Mr. Gill were swept away, happily without loss of life. At this point a schoolhouse was whirled away, leaving the floor, and not a timber of the house has been discovered. In section 34 of the same township, the buildings of Mr. William Nixon were damaged. The storm passed north of Granger, causing damage at various points. In section 4, Jefferson township, Polk county, Mr. Heckman's buildings were destroyed and a fine grove of trees ruined—"twisted into matches"—but no one injured. At that place, Mr. Heckman says, the storm cloud deflected southward a mile or two, then crossed the river and went eastward toward Ankeny, Bondurant and Valeria. A number of losses were suffered near Ankeny, in Crocker township; also in Douglas and Franklin townships, near Bondurant. The storm then passed into Poweshiek township, Jasper county, striking Valeria in its course, and going thence north of east to a point near Baxter, where its destructive force abated. From the point of inception to its ending the track forms a slightly curved line, or change of course from southeast toward the northeast. The width of the main track was from about 1,000 to 3,000 feet. Outside of this track some destructive effects were produced by lateral currents, or side winds flowing towards the central shaft or funnel. There are some indications of the action of several minor tornadoes within the belt covered by the storm. Losses have been reported in Madison township, several miles from the main track.

A visit to Bondurant and Valeria, by the director and assistant director of this service, gave sufficient evidence as to the character of the storm. The characteristic effects of tornadic force were noted at a number of points, notably at the Bailey farm, near Bondurant, at Valeria and in the timbered tract along the Great Western railway east of the latter place. On the south side of the central track trees and wreckage of buildings pointed toward the northeast; north of the center the debris was strewn towards the southwest. The uplifting power of the storm were shown in the uprooting of trees and tossing them bodily, roots, trunks and branches, over the railway embankment. The writer saw one instance of that kind, the tree measuring 18 inches in diameter at the butt and well proportioned in height. Scores of very heavy trees were first uprooted and then dragged bodily, tops foremost, from five to ten rods. The destructien of the railway bridge beyond Valeria was a marvelous exhibition of the uplifting force of the storm at the center of its track.

Luckily there was no town on the direct line of the storm, though it narrowly missed Bondurant and grazed Valeria closely. If either place had been right in its path, no habitation or other building would have survived the shock. The entire length of the pathway of destruction was nearly forty miles, though at numerous points on the line but slight effects are visible.

The destruction of property will probably aggregate from $70,000 to $80,000; but worst of all is the loss of human lives, and the terrible suffering endured by the bruised and mangled survivors. The total number of deaths is reported to be twenty people, of various ages.

The time occupied in passing over the forty miles of its track was about an hour and twenty minutes, as nearly as we can estimate from the various reports. It is said that the clocks which were stopped near Valeria, point to the hour of 10:40. At Bondurant the residents say the storm struck there at 10:30. It certainly began its operation at the extreme western end of the line as early as 9:20 P. M.

STORMS AT OTHER POINTS.

On the same night (May 24th) severe wind squalls occurred at various points in Delaware and Dubuque counties, followed by heavy downpours, causing destructive floods.

Near Manchester numerous buildings were leveled by the hurricane, and at Dyersville and New Vienna extensive damage was caused by floods.

A cloudburst caused a very damaging flood between North McGregor and Beulah, and newspaper reports state that three whole families were swept away with a loss of eighteen lives. The entire valley between those two points was swept nearly clean of bridges and buildings. Numerous freight cars were swept from the tracks of the Chicago, Milwaukee & St. Paul road and several thousand feet of railway track carried away.

The floods were also damaging at Dubuque, and at Durango, six miles west of Dubuque, the railway station was swept away and five persons were drowned. It was a night of fearful storms, attended by loss of life and property, in Iowa, Illinois and other western states.

JUNE.

The month of June was notably genial and favorable to all forms of life. The mean temperature for the state was 69.1°, which is the normal for the month. There were but few oppressively warm days, and these were followed by nights of refreshing coolness.

The average precipitation, as shown by the records of 105 stations, was 3.11 inches. The distribution was quite unequal, the largest amount reported being 7.89 inches at Atlantic, and the least .81 of an inch at Vinton. The rainfall was 1.48 inches below the June normal, but the ample supply of water stored in the soil in April and May prevented any injury to crops by the shortage in this month.

OBSERVERS' NOTES.

Amana—C. SCHADT: Harvesting rye began on the 22d.

Atlantic—J. W. LOVE: Hail stones larger than hens' eggs fell for several minutes on the 5th.

Atlantic (near)—GEO. W. FRANKLIN: High wind from northwest at 11:30 P. M., 24th. Windmills, small buildings, etc., were destroyed.

Bonaparte—HON. B. R. VALE: A seasonable month and no heavy rains or storms, but a uniformly low barometer from May 10th to the close of June without much variation.

Clinton—DR. LUKE ROBERTS: June, 1896, was a very fine month. The growth and development of all products of the farm have been almost phenomenal. The same can be said of garden truck and most kinds of fruit. The apple crop seems not as great as in some years. Berries and grapes are abundant—the former of excellent quality and the latter promise to be. The vines seem much more vigorous and hearty than for several years.

JULY.

The mean temperature of July, shown by reports from 102 meteorological stations, was 73.6°, which is .5° below normal. The highest temperature reported was 104°, at Malvern, on the 3d; lowest, 42°, at Elkader and Mason City, on the 9th and 16th.

The average rainfall for the state, as reported from 105 stations, was 6.90 inches, which is 2.60 inches above the normal. The bulk of this large amount of rainfall came in the last half of the month, causing much delay in completing harvesting and considerable damage to grain in shock and stack. The largest amount reported was 12 67 inches, at Mooar, and the least amount, 1.61 inches, at Rock Rapids. It was an unusually wet July, especially unfavorable for harvesting and threshing small grain. Heavy showers with severe wind squalls were frequent in the latter part of the month.

OBSERVERS' NOTES.

Alta—DAVID E. HADDEN: A destructive hail and windstorm passed through the north central part of Buena Vista county Sunday evening, the 26th, about 7 o'clock. The day had been peculiarly warm and oppressive, and during the afternoon a storm formed in the south. It passed over town in the shape of a gentle and refreshing shower. About half past 6 another storm formed in the northwest, the clouds being of a deep blue color. It swept along the northern horizon and disappeared to the northeast. Monday morning the news of a terrible hailstorm reached town. It entered the county on the west lines of Elk and Brooke townships, and was four miles in width. Crops were devastated, poultry and young stock killed or drowned, windows and roofs smashed by the falling hail. With possible exceptions, the crops on the four tiers of sections are entirely destroyed. The storm continued through Scott and Lincoln townships with terrible destruction to everything in the shape of vegetation. It is estimated the damage in this county will reach the neighborhood of $60,000. A number of the farmers affected by the storm carried insurance on their crop and stock. The Farmers Mutual of Buena Vista county is interested in several instances. It is very hard on some of the farmers who have been working all summer, and who see their work and expenditures come to naught in a few minutes.

In Cherokee and Plymouth counties the storm did a vast amount of damage, these counties being hit as hard as Buena Vista.

Plover—J. S. SMITH: Sunday night, the 26th, heavy north wind blew corn down quite bad. Eight miles south the wind did considerable damage to corn. There was also considerable damage done by hail during the storm.

Portsmouth—J. W. DAHLHEIMER: On the 26th, terrific windstorm accompanied with thunder and rain.

Primghar—E. S. PROPER: Terrific windstorm on the evening of the 2d. Considerable damage done; barns, etc., blown down.

Sidney—G. V. SWEARINGEN: An electric storm on the night of the 27th. No damage done. Lightning almost continuous for about four hours: a few heavy peals of thunder. Considerable wind, which downed corn badly in many places; also upset and unroofed a number of corn cribs and outbuildings on the west of Nishna.

Le Mars—DR. T. E. COLE: A thunderstorm on the 26th was light in this city, but in northern, eastern and western parts of county was accompanied by heavy hail, doing a great amount of damage, laying small grain and corn, and killing poultry and hogs.

AUGUST.

The mean temperature for August was 71.7°, which is .7° above the normal for this month. The first half of the month brought the highest temperature of the season, the protracted heated term being phenomenally severe on account of the excessive humidity. The excess of temperature at the central station for the first fifteen days of the month was 64°, or more than 4° daily. The mean relative humidity for that period was 76 per cent. The last half of the month was cooler than the seasonal average, bringing the mean temperature of the month down to about the normal.

The average precipitation for the state was 3.52 inches, which is about the normal amount for August. The distribution was quite unequal, the northern districts receiving less than other sections. The highest amount reported was 12.25 inches, at Centerville, and the least quantity .86 of an inch, at Sioux City. Thunder and hailstorms of unusual severity occurred in numerous localities.

OBSERVERS' NOTES.

Afton—HON. N. W. ROWELL: Rivers and creeks all out on bottoms on the 14th; highest since July 5, 1888.

Bonaparte—HON. B. R. VALE: A poor month for saving the grain crop; vegetation, weeds and grass unprecedented. Closed favorable for maturing the corn crop.

Corning—John W. Bixby: Hot wind from the southwest on the 11th, which scorched leaves on the trees.

Estherville—M. L. Archer: On the 15th, severe electric storm with high wind, blowing down frail buildings and outbuildings. Grain stacks and corn blown down.

Grand Meadow—F. M. Williams: August 15th, a heavy thunderstorm, with wind and a little hail, did great damage to windmills, trees and grain stacks; also blew corn down badly. A peculiarity of the month was the bright days and bracing nights.

Northwood—A. L. Thompson: Excessive heat for this section 3d to 10th, inclusive.

Ovid—H. C. Miller: Heavy thunderstorms on the 5th, 14th and 15th, with much destruction to property by lightning; six horses killed, more than twenty head of cattle and four barns destroyed. Several other buildings struck, some stacks damaged. Many meteors seen the nights of the 3d and 4th.

Spencer—F. E. Willard: Severe thunderstorms on the 14th and 15th. On the 15th lightning struck the German Lutheran church, setting fire to the roof and damaging the church about $100.

Toledo—Chas. Mason: About three inches of rain fell this month, accompanied by a great amount of electricity, doing much damage in striking and burning buildings, and killing, etc. No mention is made of any rodded buildings being struck, in the reports.

SEPTEMBER.

The month of September was unseasonably cold and wet, with less than the average amount of sunshine. The mean temperature for the state was 58 5°—3.5° below the September normal. The highest temperature reported was 95° at Bonaparte on the 2d, and at Malvern on the 8th; lowest temperature reported, 22° on the 27th at Mason City. Severe and killing frosts occurred on several days in the last decade of the month.

The average precipitation was 4.09 inches—.39 of an inch above normal. The distribution was quite unequal, ranging from 9.96 inches at Mooar to 1.82 inches at Iowa City.

It was an unfavorable month for ripening belated corn, and the early frost caught some of it in a premature stage.

OBSERVERS' NOTES.

Afton—Hon. N. W. Rowell: Night of the 19th, first frost. No damage to vegetation. Twentieth, corn blades frosted; corn not hurt.

Alta—Prof. D. E. Hadden: First killing frost of the season on morning of 19th.

Bonaparte—Hon. B. R. Vale: A very dismal month. Vegetation kept green, and but little fall work accomplished.

Clinton—Dr. Luke Roberts: September, 1896, opened with three clear days, then two partly cloudy days, followed by two more clear days. The principal clear days during the balance of the month were the 19th to the 23d, both inclusive. The 19th and 20th were cold, the first frost of the season coming on the morning of the latter date. This was a killing frost, the temperature of the air dropping to 31°. Quite a heavy frost also came on the 23d, with minimum temperature 33°. On the 28th a lighter frost occurred. No other frost during the month. The earliest autumnal frost during the last eighteen years was on the 8th of September, 1880, but was light.

Cresco—GREGORY MARSHALL: First killing frost occurred on the 20th. Ice formed.

Grand Meadow—F. M. WILLIAMS: The month has been cloudy and wet; corn all ripened before the frost came. Threshing is very slow with a good deal of wet grain. Fall feed is fine; spring seeding a good outlook.

Larrabee—H. B. STREVER: Vegetation killed by frost on the 19th.

Logan—MRS. M. B. STERN: The month has been rather cool; an unusual number of frosty mornings for September, and yet, away from the bottom lands, things are not badly killed.

Sac City—DR. CALEB BROWN: Light frost morning of 19th. Corn and tender vegetation bitten.

OCTOBER.

The month of October gave an average amount of clear and pleasant weather, although there was a slight excess of rainfall, which occurred during the periods as follows: from the 1st to the 5th, light and scattered showers occurred. Heavy and general rains occurred from the 9th to the 11th and from the 27th to the 30th, the remainder of the month being clear with about the normal October temperature. The average amount of rainfall was 3.13 inches—.28 of an inch above normal, and with few exceptions, was well distributed.

The average temperature for the state was 47.9°—1.6° below normal for the month. As there was but an average of 5 days on which .01 inch or more of precipitation fell, and 18 clear, and 6 partly cloudy days, it will be seen that the weather was favorable for fall plowing and harvesting of corn.

NOVEMBER.

The month was characterized by sharp reactions and wide ranges of temperature. The mean temperature for the state was 29.6°, which is 4.5° below the normal for November. Wintry weather prevailed for the most part during the last half of the month, with heavy snows in the northern districts of the state. Spirit Lake reported the lowest monthly mean, 19.2°, which is below the December normal.

The average range of temperature was 73.1°. The lowest temperature reported was 15° below zero at Rock Rapids on the 30th. Highest temperature, 82° at Belknap on the 16th.

The average precipitation (rain and melted snow) was 1.83 inches—.07 of an inch above normal. The largest amount reported was 4.51 inches at Spencer; least amount, .16 at Atlantic.

DECEMBER.

The month of December was unseasonably warm, the daily mean temperature for the state being 30.8°, which is 7° above the normal. The daily mean was 1.2° above the temperature of November. There have been few warmer Decembers within the past twenty-five years. It was, in fact, too warm and murky at times for the best condition of public health.

The average precipitation was .65 of an inch — 1 inch below the normal amount for December. There was no snow within the limits of the state at the close of the month.

OBSERVERS' NOTES.

Amana—CONRAD SCHADT: Plowing went on the greater part of the month. At the close of the year the ground was free from frost and the river and creeks free from ice.

Bonaparte—HON. B. R. VALE: A rare December for all kinds of outdoor labor and for feeding stock. Cattle and horses have done well on meadows and pastures all fall.

Delaware—WILLIAM BALL: The month has been remarkable for high temperature, lack of sunshine and foggy weather.

Grand Meadow—F. L. WILLIAMS: The month was abnormally warm; ground bare most of the time and the roads either muddy or very rough. On the 31st the frost was nearly all out of the ground and the surface very wet

Hopeville—M. T. ASHLEY: Total precipitation for 1896, 41.41 inches. Does anyone think Iowa is drying up?

Lenox—J. L. HURLEY: Ice out of ponds since the 28th. Thickness of ice for the month, 2 inches.

Ovid—H. C. MILLER: A warm rain on the 31st. Frost all out of the ground and grass growing. No ice on the ponds and streams. A very warm month, with an unusual number of foggy days and but light rains and snowfall.

Carroll—MOSES SIMON: December closed with a heavy rain, the frost nearly all out of the soil, and the roads in bad condition. Grass is turning green and it looks like spring.

THE WEATHER AT CLINTON.

DR. LUKE ROBERTS' ANNUAL REVIEW.

During the first five days of the year 1896 an unusual cold wave prevailed. This storm spread over the entire United States, except the extreme southern portion of the Florida peninsula. This cold wave was not marked for its extreme severity in Iowa, as in many other portions of the United States. The lowest temperature at Clinton during these five days was 10° below zero, and the maximum velocity of the wind was 22 miles an hour during a portion of the 3d.

The balance of the month was warm, but cloudy. The mean temperature for the month was 25 5°, being 8.7° above a January normal. Storm days were few and the precipitation light. A fine misty rain and a dense fog were the closing phenomena of the month. Moderate temperature continued till the 15th of February. On the 18th a windstorm of great severity came from the west, bringing with it clouds of sand and dirt gathered from exposed fields, and mixed it with the snow which it lifted from the ground, and the combination moving at a speed of 30 miles an hour yielded no tranquillity of mind to those exposed thereto.

The cold period of the month is included in the 11th, 12th and 13th. Precipitation was light and drouthy conditions prevailed at the close of the month. The first storm following — a snowstorm — was precipitated on the 8th of April, while the temperature ranged from 32 to 36°. This coating of snow after so many stormless days, proved a great blessing, and nicely prepared the way for the numerous gentle showers which followed.

A washout storm visited this vicinity on the 28th, doing some damage. The month was unusually warm and showery, resulting in favorable conditions for the early development of grass and seeded fields.

May continued the flattering conditions for the growth and maturing of crops, so that from the 4th of April to the close of May there was a continued warmth in the air above normal; and, with frequent showers, vegetation made a rapid and continuous growth. The hot spell in this month was from the 5th to the 13th inclusive, and during that time the maximum temperature was above 90° for seven consecutive days. The weather continued favorable for growing crops throughout the month of June, the result being phenomenal. All products of the farm and garden, apples, berries, grapes, etc., gave promise of a large yield and of excellent quality. The three months ending on the 30th of June, 1896, were warmer than any corresponding period during the last eighteen years. This was due to the abnormal heat of April and May, June not having contributed to swell the excess of heat. Much thunder and lightning prevailed in June, doing some damage.

An excess of rain was the prominent phenomena of July. Other meteorological conditions did not depart materially from the July normal. The precipitation on the 18th, 21st and 23d was very heavy, especially that of the 21st, yielding 2.30 inches of water, the greater part of which fell in twenty minutes time. A little hail accompanied this storm, and the wind attained a velocity of thirty-two miles an hour. This storm was damaging to oats. Farther up the river, the water, in its violent descent through ravines, carried away much dirt and occasionally a bridge. The heavy rains caused a shrinkage in the hay crop, but in no way interfered with pasturage.

It was conceded that the value of the excess of precipitation and warm days and much sunshine had been of such incalculable benefit in Clinton county that any damage which resulted from excess of water was merely nominal. The soil was once more supplied with needed moisture, and springs and wells again yielded their customary flow of sparkling water The fields became green and beautiful in their freshness, the trees and shrubs appeared smiling at the prospect of a renewal of life and brightened foliagé, and the husbandman was happy in the prospect of an overflow in his granaries.

August gave propitious weather for farming interests, and the outlook at the close of the month was satisfactory. Unharvested crops, with the exception of potatoes, were exceptionally promising. Corn was then looked upon as a great crop; and, when harvest time came, later in the season, the forecast was verified. Threshing was practically completed at the close of this month. Some marked phenomena, however, characterized the month of August. Extremes in temperature and the frightful play of electricity deserve some notice. From the 26th of July to the 12th of August the heat was great, and comfortable sleeping places were at a premium. With the exception of a few single days, no more excessive heat prevailed.

Wind, rain and electricity were the elements which brought fright to the people and destruction of their property on the 6th, 11th, 13th, 15th and 22d. The work of these players brought a harvest of damaged roads, prostrated crops, trees broken and uprooted, windmills demolished, skylights broken, awnings and signs carelessly handled, buildings demolished, barns, farm implements and grain burned, and cattle killed, besides some mischief by fooling with electric wires. These storms were not confined to the city, but embraced the country. September furnished an excess of rain and cloudiness, and a deficiency of heat and sunshine. These were the conditions which caused the slow maturity of the enormous corn crop, which had all along been so promising. Pastures at the close of the month were never better at the same date of season. A deficiency in warmth continued through October, but an excess of clear days and absence of precipitation did much to save the corn and harden it. A copious rainfall on the 29th was the principal storm of the month.

November and December were each deficient in rainfall, and each gave a temperature above normal, but the latter was more marked than the former. December's epilogue to the drama of 1896 was excessive foggy, and "his gloom grew upon him."

CONSPECTUS.

Highest temperature, 97.5°, July 14th and August 8th.

Lowest temperature, 12° below zero, February 17th and 21st.

Extreme range of temperature, 109.5°.

Mean daily temperature, 49.4°.

Mean daily range of temperature, 21.6°.

Greatest mean monthly range of temperature, 25.4°, July.

Least mean monthly range of temperature, 15.5°, December.

Greatest daily range of temperature, 40°, March 30th.

Least daily range of temperature, 4°, December 6th.

Warmest month, July; mean temperature, 73.5°; 1.5° above that of 1895.

Coldest month, January; mean temperature, 25.5°.

Warmest days, July 14th and August 4th; mean temperature, 84.7°; 4:2° above that of 1895.

Coldest day, January 3d, 5.5° below zero.

Total number of days with maximum temperature 90° or above, 37; 8 in May, 7 of which were consecutive, from the 6th to the 12th inclusive; 7 in June, 14 in July and 8 in August.

Total number of days with the maximum temperature at 32° or below, 38; 9 in January, 9 in February, 5 in March, 7 in November, 8 in December.

Total number of days with the minimum temperature at or below 32°, 153; 30 in January, 27 in February, 26 in March, 9 in April, 1 in September, 10 in October, 23 in November and 27 in December.

Mean daily cloudiness, 46 per cent of the surface of the sky.

Months with the greatest per cent of cloudiness, January, 62, and December, 62.

Month with the least per cent of cloudiness, August, 33.

Total number of clear days, 142.

Total number of cloudy days, 110.

Month with the greatest number of clear days, August, 19.

Month with the least number of clear days, November, 7.

Month with the greatest number of cloudy days, January, 16.

Month with the least number of cloudy days, August, 3.

PRECIPITATION.

Total depth of snowfall, 27 inches.

Greatest fall of snow at any one storm, 9 inches, February 12th.

Total precipitation (rain and snow melted), 33.36 inches.

Greatest rainfall at any one storm, 2.30 inches, July 21st.

Month with the greatest precipitation, July, 7.13 inches.

Month with the least precipitation, November, .72 inch.

Month with the greatest number of storm days, September, 13.

Month with the least number of storm days, October, 2.

Total number of storm days, 96.

THE WIND.

Total movement of the wind, 42,100 miles.

Maximum velocity per hour, 32 miles in April, July and August.

Greatest monthly movement, 5,500 miles, in March.

Least monthly movement, 1,420 miles, in August.

Prevailing direction of the wind was from the west.

Observations taken at 7 A. M., 2 P. M. and 9 P. M., show the movement of the wind to have been from the north, 76 times; from the northeast, 143 times; from the east, 101 times; from the southeast, 101 times; from the south, 160 times; from the southwest, 173 times; from the west, 194 times; from the northwest, 150 times.

Maximum velocity for January, 24 miles an hour; for February, 30 miles; for March, 22 miles; for April, 32 miles; for May, 26 miles; for June, 20 miles; for July, 32 miles; for August, 32 miles; for September, 20 miles; for October, 16 miles; for November, 20 miles; for December, 22 miles.

SNOW AND FROST.

The last spring snow fell on the 8th day of April, 2 inches.

The first snow in autumn came on the 5th day of November. It was visible but not measurable

The first snow to cover the ground made its arrival on the 3d of December and was about 1 inch deep. It disappeared the second day.

Last killing frost in the spring, April 10th. A light frost on the 22d.

First killing frost in autumn, September 20th.

Number of consecutive days without frost, 150; 13 more than in 1895.

The temperature of the air was at the freezing point or below for the last time in the spring, on the 10th day of April; 34 days earlier than in 1895.

The first in autumn, September 20th; 10 days earlier than in 1895.

The last day in spring when the mean temperature was below 32°, April 2d.

The first in autumn, October 24th.

ELECTRIC METEORS.

Number of auroras observed, 1.

Number of days with thunder and lightning, 35; being 4 above normal.

OPTICAL METEORS.

Number of solar halos observed, 1.

Number of lunar halos observed, 11.

Following is a table showing the yearly mean temperature, rainfall and movement of wind in miles for the years named:

YEARS.	Mean temperature in degrees.	Rainfall in inches and hundredths.	Wind movement in miles.
1879	45.9	33.96	....
1880	47.7	37 02	....
1881	47.6	41.18	....
1882	47.8	41.98	64,442
1883	44 0	38 71	63,566
1884	45.7	43.04	54,114
1885	43.8	38.21	54,693
1886	46.6	28.71	44,263
1887	47.2	34.01	53,110
1888	45.1	35 76	56,800
1889	48.1	32.18	48,720
1890	48 6	31.86	51,890
1891	48 3	33.87	48,625
1892	46 4	40.78	43,890
1893	46.2	30.39	51,600
1894	49.8	27.47	50,040
1895	47.2	30.38	45,090
1896	49.4	33.36	42,010
Sums	845.4	632.82	772,353
Means	46.9	35.15	51,490

The above table shows the following facts: That the extreme range of the yearly mean temperature for the 18 years was 6°; that the greatest yearly mean was in 1894, and the least in 1885. That the total rainfall during 18 years was 52.73 feet. That the total number of miles the wind traveled during the last 15 years, at the speed it passed this city, was 772,353 miles, or an average of 990 miles per week, 6.30 miles an hour, and that the mean temperature for 1896 was 2.5° colder than an average of the last 18 years.

RIVER STATISTICS,

Furnished by Harry A. Walden, of the Chicago & Northwestern railroad:

Ice started 7 A. M., March 20th, and at 10 o'clock the same morning the Mississippi river was practically clear of ice. The first boat to pass the bridge was the Chancy Lamb, going up at 4:25, March 26th.

The total number of boats which passed the bridge during the season was 2,793—1,400 going up and 1,393 going down. There were also 370 barges and 828 rafts.

The river closed to navigation November 29th. November 28th, at 7 P. M., ice commenced to move, and blocked at 7:30 A. M., November 29th, but started again at 10:30 A. M., and ran until 8 A. M., November 30th, blocking solid. On December 9th the ice started again at 2:25 P. M., and stopped again after moving 100 feet, remaining closed until the 12th at 11:45 A. M., when a movement commenced, and after several days the river was free of ice. During this opening, the steamboat R. D. Kendall passed up at 7:35 A. M., December 30th. The river was clear of ice at the close of the year.

Water averaged low during the season, and was especially low during the months of January, February, March, April, August, September. October, and part of November and December. The lowest stage of water was .2 of a foot—March 20th. The highest was 13.5 feet, May 28th.

IOWA'S SOIL PRODUCTS.

REVIEW OF THE CROP SEASON, 1896.

The crop season of 1896 in Iowa was characterized by an excess of heat and moisture, especially during the periods of seeding and harvesting.

The winter months were milder than usual, with less than the usual amount of precipitation, making favorable conditions for wintering stock. March was cool and dry, with frequent duststorms of considerable severity, causing delay and inconvenience in early spring work on the farms.

The first week in April brought a cold wave of considerable severity, with high winds and freezing weather on the 1st and 2d, and sharp frosts nearly every day until the 10th, which was the date of the last killing frost observed within the state. The second and third decades of the month were excessively warm and wet; the daily mean temperature for the state for the full month being 5.5° above normal, and the rainfall 2.42 inches in excess of the April average. The high temperature and frequent showers in the second and third decades pushed vegetation forward with unusual rapidity, and at the close of the month the season was rated ten days early. It was a notably favorable month for farm work and the germination of crops

The mean temperature of May was 5.8° above the normal: and the records of the U. S. Weather Bureau stations within the state show that it was the warmest May since 1881. The average rainfall was 6.69 inches. which is 2.54 inches above the normal. The bulk of the rainfall occurred in the second decade of the month. Nearly all parts of the state suffered to some extent from excess of moisture, and from the effects of heavy windstorms accompanying the rainfall. The first decade of the month afforded generally favorable conditions for planting and cultivating corn.

and the outcome of the season approves the wisdom of those who vigorously pushed the work within that time. From the 10th to the 27th frequent showers and occasional heavy rains retarded field work in nearly all parts of the state.

The month of June was notably genial and favorable to all forms of life. The mean temperature was about normal, and the average rainfall was 3.11 inches, which is 1.84 inches below the normal for this state. But the ample supply of moisture stored in the soil by excessive rainfall in April and May prevented any injury to crops by the shortage in June. All crops made excellent progress, and conditions were favorable for field work. An unusually large acreage of hay was cut before the close of the month.

The mean temperature of July was about normal, and the average rainfall was 2.60 inches in excess. The first half of the month was generally fair; the latter half was showery and cloudy, with conditions generally unfavorable for harvesting and stacking the small grain crops. The oats crop, which at an early period was unusually promising, was badly damaged by rust and lodging before harvest, and its ruin was well nigh completed by excessive heat and moisture after it was cut and shocked. Other small grain crops were badly injured by the same unfavorable conditions.

The daily mean temperature of August was about normal, but the first half of the month brought the highest temperature of the season, and the protracted heated term was phenomenally severe on account of excessive humidity. The frequent showers and high percentage of humidity of the first half of August, following the excessive rainfall in the latter part of July, made the harvest season of 1896 one of the most unfavorable ever known in this state. Pastures, meadows, and vegetation generally were given a season of luxuriant growth, but the ripened grain crops suffered material damage.

The corn crop was unusually heavy and promising in the latter part of August, but the weather conditions in the last week of that month and the first half of September were unfavorable for ripening the late planted fields. The month of September was unseasonably cool and wet, with less than the average amount of sunshine; and heavy frosts in the last decade of the month brought the growing and ripening season to a premature close. The early planted fields, comprising the larger part of the corn crop, were fairly well matured and prepared for the advent of freezing weather. But the crop as a whole will not make the phenomenal yield that was promised in midsummer

The season as a whole has been fairly good, and the growth of all kinds of vegetation has been phenomenally heavy. If the conditions had been as favorable for harvesting small grain, and for ripening the corn crop, as they were for the growth of grasses and other forms of vegetation, the summer of 1896 would have been notable among the seasons of great productiveness.

For study and comparison we give below a table showing the average rainfall in inches for Iowa, in the six crop months—April 1st to October 1st—for the years from 1890 to 1896, inclusive:

YEARS.	April.	May.	June.	July.	August.	September.	Totals.
1890	1.78	3.56	7.76	1.98	3.41	2.97	21.46
1891	2.15	3.18	6.39	4.22	4.24	1.33	20.51
1892	4.75	8.77	5.19	5.29	2.24	1.53	27.77
1893	4.21	3.45	3.91	3.33	2.38	2.34	19.56
1894	3.07	1.37	2.67	.63	1.58	3.57	13.39
1895	2.62	3.19	4.32	3.40	4.43	3.03	20.99
1896	5.08	6.69	3.11	6.90	3.52	4.09	29.33
Normals	2.60	4.15	4.95	4.30	3.60	3.70	23.30

The total precipitation for the state for the nine months ending September 31st has been 31.62 inches. The normal for that period is 28.22 inches, showing an excess for the year thus far of 3.40 inches.

JUNE CROP REPORT.

The crop season of 1896 was, on June 1st, about ten days early, compared with the average of former years. The high temperature and excessive rainfall in April and May, causing semi-tropical weather conditions, produced an abnormally rapid growth of vegetation. Seeding, planting and cultivating have been materially delayed by frequent showers and excess of moisture in the fields, so that farm work is generally belated, compared with the season of crop growth. Early planting has this season brought the best results, giving promise of the most abundant harvest.

Since June 1st there has been a material lowering of the condition of corn, oats, spring wheat and barley, on account of heavy rains in large portions of the state. If these reports had been made the 10th instead of the 1st they would undoubtedly be several points lower as to condition of cereals and acreage of corn. On the 1st a considerable area of land prepared for corn had not been planted, though it was included in the estimates of acreage. Some of this will not be planted this season and it is probable that on account of abandonment of wet fields the acreage of corn will this year be from 5 to 10 per cent less than in 1895. We shall call for a revised report of acreage of corn in the July report.

Winter Wheat—Compared with 1895 the acreage of winter wheat appears to be decreased 6 per cent, making a present acreage of 197,150 acres. Average condition, 94 per cent.

Spring Wheat.—Acreage increased 2 per cent, making present area 542,095 acres. Condition, 96 per cent.

Corn.—According to the state census report for 1895 the acreage of corn in 1894 was 8,648,804. Accepting this as the official basis of estimates, the acreage of corn planted this year is about 8,562,416. The condition June 1st was estimated at 89 per cent. We think that later investigations will show the acreage estimate to be too high.

Oats.—Acreage, 4,346,110; average condition June 1st, 101 per cent.

Rye.—Acreage 121,670 acres; condition, 98 per cent.

Barley.—Acreage 547,642 acres; condition, 99 per cent.

Timothy and Clover.—Show a slight decrease of area, the present acreage being about 2,250,960 acres; condition of timothy, 97; clover, 101 per cent.

Millet.—Condition, 98 per cent; considerable seeding after June 1st.

Flax.—Acreage, 199,128 acres; condition 96 per cent.

Broom Corn.—Acreage, 1,344 acres; condition, 95 per cent.

Potatoes.—Acreage reduced 8 per cent compared with 1895; probably about the same as in 1894, 170,285 acres; condition, 99 per cent.

Sweet Potatoes.—Condition, 97 per cent.

Sorghum.—Condition, 93 per cent.

Fruit.—Condition of apples, 87; pears, 76; plums, 59; peaches, 85; grapes, 90; blackberries, 91; raspberries, 95; strawberries, 89; currants, 71; cherries, 70.

Live Stock.—Cattle, 101; sheep, 100; hogs, 99; spring pig crop, 85; horses, 98; foals, 76.

Meadows are rated at 102 and pastures at 109 per cent.

JULY CROP REPORT.

The month of June was generally favorable for the growth of the principal crops, the temperature being about normal, and the moisture sufficient for the needs of vegetation. The rank growth of oats and other spring grain crops, caused by the excessive heat and moisture of the preceding months, resulted in material injury by rust and lodging, the oats crop suffering the greatest amount of damage. The report shows an average decline of oats, 10 points; winter wheat, 3; spring wheat, 9; barley 2, and rye 5, as a result of the conditions referred to above. Corn has steadily gained and gives promise of attaining the normal standard.

The revised reports on the acreage of corn show it to be 98 per cent, compared with the area harvested in 1895. This would indicate a present acreage of 8,475,000 acres, on the basis of the state census returns for the year 1894.

The average condition of the staple crops July 1st is shown to be as follows:

Winter wheat, 91; spring wheat, 87; corn, 92; oats, 91; rye, 93; barley, 97; timothy, 95; clover, 100; millet. 95; flax, 94; broom corn, 91; potatoes, 100; sweet potatoes, 95; sorghum, 92; apples, 83; pears, 33; plums, 44; peaches, 88; grapes, 92 per cent.

AUGUST CROP REPORT.

The reports of correspondents of this bureau for August make a fair showing as to the condition of corn and other growing crops. The weather was unseasonably wet during the last half of July, and while this was favorable to corn, grass and potatoes, the frequent showers were very damaging to unstacked grain and hay. Oats suffered great injury, especially in the central and southern districts. The following figures show the average condition of the unharvested crops:

Corn, 98 per cent; millet, 97; flax, 97; broom corn, 95; pototoes, 91; apples, 89; grapes, 95; pastures, 103.

Threshing reports and estimates indicate an average yield per acre of harvested crops, as follows:

Oats, 26 bushels; winter wheat, 18; spring wheat, 14; rye, 16; barley, 28. Yield of timothy hay per acre, 1.6 tons; clover hay, 1.8 tons.

DECEMBER CROP REPORT.

The general crop report for the season of 1896 is herewith submitted, showing average yield by counties of staple farm products, and average prices at stations nearest the farms on December 1st.

The estimates of total yield of the various crops for the state are made on the basis of the data contained in the Iowa census report for 1895, with estimates of increase or decrease of acreage in the years intervening since the crop season of 1894:

Winter Wheat.—The number of acres sown in 1894 and harvested in 1895, according to the census, was 209,613. There appears to have been a slight decrease in the acreage harvested in 1896, the number of acres this season estimated to be 197,150. Average yield, 17 bushels per acre; total bushels for the state, 3,351,550. Average price, 60 cents per bushel; value of product, $2,010,930.

Spring Wheat.—Number of acres harvested, 542,095; average yield per acre, 13 bushels; total yield, 7,047,235 bushels. Average price per bushel, December 1st, 57 cents; total value, $4,016,923.

Corn.—The total acreage of corn grown in Iowa this season is involved in some doubt According to the census, the acreage in 1894 was 8,648,804 acres. I believe those figures are from 1,000,000 to 2,000,000 above the actual acreage of that year, but until the new census is made by the assessors in 1897, we must accept the official basis at hand. Estimating a decrease of about 7 per cent, we have this season 8,043,390 acres. The average yield is 39 bushels per acre; total product, 313,692,210 Average price, 14 cents per bushel; total value, if all sold at that price, $43,916.904.

In quality the crop is somewhat disappointing. An unusually large per cent is soft and in poor condition to crib. The harvesting season has been quite unfavorable, and it is probable that above 20 per cent of the crop was still in the fields December 1st. Compared with the crop of 1895, the corn output of this season will fall short in feeding value fully 15 per cent. The yield per acre is heavier than usual.

Oats.—The acreage sown was about 4,346,000 acres. Prior to July 1st the condition of the crop was promising, but by the combined effects of blight, rust, lodging and unfavorable harvest weather, the output has been the poorest ever grown in Iowa. Of the total acreage seeded, not more than 65 per cent was harvested and threshed, and a considerable percentage of the grain that was garnered was not worth the cost of harvesting and threshing. The average yield by measure of the area harvested appears to be 26 bushels per acre, which, by weight, would not exceed an average of 22 bushels. This, on an acreage of 2,825,000 acres harvested and threshed, would give a total yield of oats by measure of 73,450,000 bushels. The average price, 12 cents per bushel, worth December 1st, $8,814,000

Rye.—Acreage, 121,670; yield per acre, 16 bushels; total product, 1,946,720 bushels. Average price, 25 cents per bushel; total value, $486,680.

Barley.—Acres harvested, 547,642; average yield, 29 bushels per acre; total product, 15,881,618 bushels. Average price, 20 cents per bushel; value, $3.176,323.

Buckwheat.—Acreage, 8,740 acres; yield, 17 bushels per acre; total yield, 147,580 bushels. Worth, December 1st, $61,983.

Flax —Acreage, 199,128 acres; average per acre, 9½ bushels; total product, 1,891,716 bushels. Value, $1,135,029.

Potatoes.—Acreage, 170,285 acres; yield per acre, 87 bushels; product, 14,814,795 bushels. Value, $2,962,959.

Sweet Potatoes.—Acres planted, 3,560; yield per acre, 81 bushels; product, 288,360 bushels. Value, $201,852.

Timothy Seed.—Acres cut, 170,000; average yield, 3.8 bushels per acre; total product, 646,000 bushels. Value, $678,300.

Clover Seed.—Number acres cut, 61,000; average yield, 2 bushels per acre; product, 122,000 bushels. Worth, $396,500.

Sorghum.—Acres planted, 19,000; average yield per acre, 90 gallons; total yield, 1,710,000 gallons. Worth, $615,600.

Hay (tame).—Acres, 2,250,960; average yield, 1½ tons per acre; total, 3,376,440 tons. Value, $15,193,980.

Prairie Hay.—Acres cut, 1,550,000; average yield, 1½ tons per acre; total product, 2,325,000 tons. Value, $7,672,500.

Millet and Hungarian Hay.—Acres cut, 90,000. Value, $540,000.

Hungarian and Millet Seed.—Estimated value, $50,000.

Broom Corn.—Average yield, .8 of a ton per acre. Value of product, $48,160.

Vegetables and Roots.—Estimated value, $475,000.

Nursery Stock.—Sold, $230,000.

Apples.—Value of product (estimated), $2,500,000.

Grapes and Other Fruits.—Estimated value, $845,000.

Market Garden Products.—Value, $370,000.

Average farm prices of horses, $37 per head: milch cows, $26; wool, 11 cents per pound.

The amount of fall plowing compared with average is 83 per cent.

The honey crop is 93 per cent of an average, and is worth $91,000.

GENERAL CROP SUMMARY.

PRODUCTS.	No. acres.	Average per acre.	Total product.	Value.
Winter wheat	197,150	17 bus.	3,351,550 bus.	$ 2,010,9[illegible]
Spring wheat	542,095	13 bus.	7,047,235 bus.	4,016,[illegible]
Corn	8,043,390	39 bus.	313,692,210 bus.	43,91[illegible]
Oats	2,825,000	26 bus.	73,450,000 bus.	[illegible],814,[illegible]
Rye	121,670	16 bus.	1,946,720 bus.	[illegible]
Barley	547,643	29 bus.	15,881,618 bus.	3,175,[illegible]
Buckwheat	8,740	17 bus.	147,580 bus.	61,[illegible]
Flax seed	199,128	9.5 bus.	1,891,716 bus.	1,135,[illegible]
Potatoes	170,285	87 bus.	14,814,795 bus.	2,962,[illegible]
Sweet potatoes	3,560	81 bus	288,360 bus.	201,[illegible]
Timothy seed	170,000	3.8 bus.	646,000 bus.	67[illegible]
Clover seed	61,000	2 bus.	122,000 bus	366,5[illegible]
Sorghum	19,000	90 gals.	1,710,000 gals	615,[illegible]
Hay (tame)	2,250,960	1.5 tons.	3,376,440 tons.	15,193,[illegible]
Hay (prairie)	1,550,000	1 5 tons.	2,325,000 tons.	7,62[illegible]
Millet hay	90,000	....	....	54[illegible]
Broom corn	....	....	....	45,1[illegible]
Vegetables and roots	....	....	....	475,0[illegible]
Nursery stock	......	....	....	23[illegible]
Apples	187,000	....	....	2,500,0[illegible]
Grapes, etc	......	....	....	84[illegible]
Garden truck	....	....	....	870,0[illegible]
Honey crop	....	....	....	91,0[illegible]
Pasturage	....	....	....	35,000,[illegible]
Corn fodder	....	....	....	2,225,0[illegible]
Total value	....	....	....	$133,664,623

From the above it appears that the total value of soil products this season is about $133,664,623 at the low prices prevailing December 1st. Of course it will be understood that no allowance is made for the large increment of value resulting from consuming these products on the farms, in the production of beef, pork, mutton, dairy products, poultry, etc

In their completed marketable form these products will bring at least 50 per cent above the minimum prices noted above.

TABLE SHOWING AVERAGE YIELD BY COUNTIES.

COUNTIES.	AVERAGE YIELD PER ACRE BY COUNTIES.																
	Winter wheat, bu.	Spring wheat, bu.	Corn, bu.	Oats, bu.	Rye, bu.	Barley, bu	Timothy seed, bu.	Clover seed, bu.	Millet seed, bu.	Flax seed, bu.	Broomcorn, tons	Irish potatoes, bu.	Sweet potatoes, bu	Sorghum, gals.	Buckwheat, bu.	Tame hay, tons.	Prairie hay, tons
Adair	20	14	42	17	19	40	3.6	1.4	12	.....	.....	78		275		1.6	[illegible]
Adams	20	10	45	20	20	18	3.0	1.5	28	5	.....	100	50	50	15	2.0	[illegible]
Allamakee	13	12	56	34	18	27	3.9	1.5	10	12	.....	113		98	15	1.6	[illegible]
Appanoose	14	..	38	19	12	...	3.1	1.8	....	10	.....	61	78	90	15	1.4	
Audubon	...	12	32	28	12	45	5.5	1.2	....	.....	.....	50	....	60	20	1.3	[illegible]
Benton	...	12	35	25	15	28	.....	2.0	...	.....	.....	58	...	....	15	1.[illegible]	[illegible]
Black Hawk	...	...	40	35	15	35	4.1	5.0	22	.....	.....	88	80	77	15	1.5	
Boone	...	16	35	27	14	21	2.8	2.0	20	.....	.....	54	70	74	15	1.8	[illegible]
Bremer	20	14	42	36	13	32	5.0	1.8	...	.....	.....	75	....	75	15	1.4	[illegible]
Buchanan	...	...	42	41	17	...	4.0	1.2	15	.....	.....	72	....	87	18	1.[illegible]	[illegible]
Buena Vista	...	11	41	32	10	33	4.4	1.6	....	10	.....	87	....	40	15	2.0	[illegible]
Butler	15	14	43	31	22	35	4.8	2.4	23	10	.....	116	..	75	19	1.5	[illegible]
Calhoun	...	17	34	37	22	35	3.5	1.8	25	9	.....	53	70	85	22	1.[illegible]	1.[illegible]

TABLE SHOWING AVERAGE YIELD BY COUNTIES—CONTINUED.

COUNTIES.	AVERAGE YIELD PER ACRE BY COUNTIES.																
	Winter wheat, bu.	Spring wheat, bu.	Corn, bu.	Oats, bu	Rye, bu.	Barley, bu	Timothy seed, bu.	Clover seed, bu.	Millet seed, bu.	Flax seed, bu.	Broom corn, tons.	Irish potatoes, bu.	Sweet potatoes, bu	Sorghum, gals.	Buckwheat, bu.	Tame hay, tons	Prairie hay, tons
Carroll	...	17	34	28	16	24	5.0	2.0	14	9	2 0	77	24	45	15	1.8	1.8
Cass	22	13	37	19	...	...	2.2	.7	....	.....	.....	100	..	..		1 6	....
Cedar	17	8	50	27	15	24	3 4	1 8	15	8	....	92	90	92	12	1.6	1.2
Cerro Gordo	...	18	35	25	12	23	3.4	2.2	26	10	.....	75	....	70	18	1.7	1.4
Cherokee	...	10	25	15	8	40	2.0	1.0		8	.....	75	....	..	....	2.0	2.0
Chickasaw	...	12	32	31	16	31	3 0	1.6	30	10	.8	76		105	15	1.4	1.4
Clarke	16	14	35	13	13	..	2.9	1.8	30	.....	.....	61	50	72	15	1.6	1.1
Clay	...	14	45	40	20	40	3.4	.....		6	.....	100	....	200	..	1.6	1.6
Clayton	14	11	47	37	20	28	5.8	2.7	30	.....	....	92	....	200	21	1.8	....
Clinton	20	15	53	30	30	26	....	.....		...	.....	95	..	...	....	1.8	1.0
Crawford	..	18	49	30	15	32	4.0	1.8	16	12	.. ..	90		123	15	2.2	2.0
Dallas	18	12	36	20	14	40	3 2	1.6	22	.....	....	84	60	52	17	2.2	1.8
Davis	15	...	41	20	15	...	2 5	2.0	...	.....	.....	108	150	150	15	1 6	....
Decatur	17	15	37	21	12	...	2.5	1.5	8	5	.....	69	49	72	18	1.7	1.2
Delaware	14	18	38	31	15	33	5.0	1.7	22	8	.....	111	150	80	19	1.4	1.2
Des Moines	19	..	45	27	18	...	3.3	1.5	...	.....	.....	113	100	120	18	1.4	2.0
Dickinson	...	16	35	39	23	41	3.5	....	...	8	.....	83	....	...	....	1 0	1.5
Dubuque	13	13	42	30	16	30	3.5	....	15	.....	.....	64	....	40	10	1.4	1.0
Emmet	...	16	32	32	18	34	4.5	...	8	11	.....	130	....	80	14	1.5	1.6
Fayette	18	14	33	32	19	34	4.3	2.0	30	12	....	79	....	90	12	1.6	1.2
Floyd	...	14	35	28	17	27	3.7	2.0	14	14	.....	63	....	75	20	1.5	1.3
Franklin	...	17	36	30	19	30	3 0	3.2	18	10	.....	66	....	100	15	1.7	1 0
Fremont	20	1	48	22	19	28	4.5	2 0	8	.....	.....	42	48	.....	...	1.9	2.0
Greene	15	15	27	25	13	31	3.5	2.4	30	9	.....	69	100	77	7	2.0	1.4
Grundy	...	15	50	32	23	35	4.0	1.4	.	11	. .	145	....	50	18	3.5	1.3
Guthrie	18	13	31	20	18	28	3.2	1.2	11	6	1.6	78	66	42	14	2.0	1.4
Hamilton	...	12	36	29	22	35	3.3	2.0	10	8	....	84	....	70	23	1.5	1.1
Hancock	...	13	34	30	17	22	3.8	2.2	20	10	.....	54	....	.....	25	1.8	1 5
Hardin	...	13	32	29	18	34	2.5	2.1	20	10	.....	77	....	80	11	1.8	1 4
Harrison	...	12	38	30	12	20	2.0	.....	30	.....	.....	66	..	60	....	1 5	1.8
Henry	17	12	42	25	19	...	3.2	1.5	..	.....	.....	81	50	80	18	1.8	1 0
Howard	14	15	32	33	19	25	3.0	1.5	19	11	. ...	77	....	40	18	1.7	1.6
Humboldt	...	15	44	30	17	23	6.0	2.5	....	11	.....	78	....	95	20	1.6	1.3
Ida	...	15	31	28	15	28	6 0	1.8	20	.....	.....	80	75	.....	....	1.9	1.7
Iowa	21	17	50	17	20	30	4 5	2.0	35	.....	.....	149	85	125	20	2.3	3.6
Jackson	24	...	40	35	20	18	6.0	1.0	....	.....	.....	142	....	.....	20	1.7	....
Jasper	16	14	44	20	16	25	2.8	1.6	12	.....	1.5	81	55	80	7	1.9	1.5
Jefferson	16	..	45	35	16	...	2.7	1.7	20	....	.5	82	63	106	29	1.8	1.5
Johnson	24	17	52	24	18	22	3.4	1.8	....	.....	.....	128	..	180	..	1.7	1.5
Jones	...	12	50	30	15	30	3 3	...	30	.....	.....	108	....	73	23	1.7	1.3
Keokuk	21	15	49	26	21	..	3 5	2.8	....	.....	.... .	101	50	93	10	1.7	....
Kossuth	...	13	37	32	15	29	4.0	2.8	....	10	....	82	....	112	15	1.5	1.1
Lee	15	...	32	21	13	...	2.0	1 6	8	.....	1.0	82	138	85	11	1.3	....
Linn	15	14	50	32	18	32	4.3	1.8	....	.....	.....	132	100	72	20	1.6	1.7
Louisa	18	15	45	20	15	...	5.0	2.0	....	.....	.... .	88	84	66	10	1.5	2.0
Lucas	17	...	41	16	14	...	2.7	1.4	.. .	.....	.....	101	50	101	28	1 3	1.0
Lyon	...	14	39	32	20	30	4 0	. .	18	12	.....	220	.	...	....	1.4	1.5
Madison	16	12	41	19	15	20	4.2	1.7	20	.....	.....	93	60	74	13	1.8	1 4
Mahaska	15	9	46	24	17	..	2 5	2 5	..	.....	.....	82	100	85	....	1.6	1.5
Marion	18	12	49	18	19	25	5.9	2.1	8	.....	.8	82	62	140	23	1.7	1.7
Marshall	20	16	37	23	14	29	4.3	1.4	40	9	.....	91	....	92	22	1 8	1.2
Mills	25	20	40	40	...	...	.....	4.0	30	.....	.....	100	150	40	...	2.0	1.5
Mitchell	12	15	35	32	16	27	4.3	1.8	14	11	.....	76	....	68	17	1.6	1.2
Monona	18	16	42	29	18	31	4 0	1.5	29	.....	.....	90	50	87	12	1.4	1.4
Monroe	14	...	39	19	15	...	3 5	1 6	18	....	.....	60	25	20	10	1.2	.
Montgomery	19	13	43	27	17	...	5 5	1 8	....	....	.....	150		...	...	1.5	1.3
Muscatine	20	11	51	24	20	25	6.2	2.0	....	. .	.....	108	138	97	....	1.8	....
O'Brien	15	14	45	45	10	35	4.0	....		8	.....	75	....	.....	....	2.1	1.5
Osceola	..	14	30	36	18	39	4.0	.	10	10	.....	92	....	....	....	1.8	1.5
Page	18	13	45	19	1	40	4 3	1.8	..	..	.....	98	150	.....	....	1.9	2.0
Palo Alto	...	14	40	37	14	35	2 1	.....	8	11	.....	84	....	..	12	1 4	1 2
Plymouth	...	14	35	22	11	28	5 5	1.2	24	10	.....	90	...	85	....	1.8	1.5
Pocahontas	..	14	35	27	15	28	2.5	3.2	33	8	.....	52	...	118	21	2.0	1 6
Polk	18	18	43	24	14	...	3 7	2.3	38	.....	.3	81	67	92	25	1.8	1.4
Pottawattamie	15	15	39	23	17	26	3.8	2.4	19	.....	....	71	95	97	17	2.0	2.2
Poweshiek	14	11	42	21	12	22	3.5	1.6		....	.....	108	200	62	...	1.8	1 5
Ringgold	17	11	35	22	13	30	3.2	1.3	20	.....	.....	73	76	119	17	1 5	1.5

TABLE SHOWING AVERAGE YIELD BY COUNTIES—CONTINUED.

COUNTIES.	AVERAGE YIELD PER ACRE BY COUNTIES																
	Winter wheat, bu.	Spring wheat, bu.	Corn, bu.	Oats, bu.	Rye, bu.	Barley, bu.	Timothy seed, bu.	Clover seed, bu.	Millet seed, bu.	Flax seed, bu.	Broom corn, tons.	Irish potatoes, bu.	Sweet potatoes, bu.	Sorghum, gals.	Buckwheat, bu.	Tame hay, tons.	Prairie hay, tons.
Sac	...	12	40	27	15	32	4.0	1.8	40	6	.....	78	....	80	20	2.0	1.6
Scott	18	14	48	29	11	24	3.9	2.2	22	.....	.....	102	138	80	15	1.5	1.6
Shelby	...	15	45	25	..	.20	7.0	1.5	20	.....	.....	60	....	.....	....	2.0	....
Sioux	..	15	38	26	27	35	4.0	3.0	....	12	.....	65		.....	..	1.5	1.2
Story	21	17	37	33	17	31	3.5	1.7	28	10	.....	82	100	86	20	1.8	1.4
Tama	25	13	42	24	16	25	4.0	3.0	9	.....	.....	129	60	135	16	2.0	1.5
Taylor	18	9	35	24	17	...	3.2	1.7	....	.....	.....	68	..	75	22	1.7	1.6
Union	18	13	36	15	14	...	3.1	1.2	...	.....	.....	74	70	69	15	1.6	1.2
Van Buren	15	...	40	26	11	...	2.6	1.9	....	.....	.....	82	50	50	17	1.4	....
Wapello	15	..	45	31	16	...	4.2	2.5	10	....	.....	119	80	92	....	1.4	
Warren	16	12	44	19	15	...	3.0	2.1	8	.....	.9	92	68	91	....	1.7	1.3
Washington	17	..	45	28	14	...	4.2	2.1		.....	.....	75	60	80	....	1.8	
Wayne	14	14	36	22	14	...	2.7	1.7	19	6	.....	54	45	82	30	1.8	1.5
Webster	25	16	40	32	20	30	4.0	3.1	17	8	.3	84	....	100	18	1.8	1.4
Winnebago	...	16	33	36	18	30	5.0	3.0	....	10	.....	110	....	.....	18	1.8	1.2
Winneshiek	11	13	43	31	17	34	4.7	1.9	...	13	....	83	....	105	16	1.7	1.3
Woodbury	...	17	34	30	..	22	1.8	....	10	12	.....	48	....	.....	15	1.5	1.5
Worth	...	8	30	35		.28	6.0	5.0		10	.....	60	....	.....	..	2.0	1.5
Wright	...	12	34	29	17	26	4.3	2.6	16	9	.....	64	....	85	9	1.5	1.5
Averages	17	13	30	26	16	29	3.75	2.0	19	9.5	.8	87	81	90.5	17	1.5	1.5

LOSS BY HOG CHOLERA IN IOWA.

FROM MONTHLY REVIEW FOR NOVEMBER.

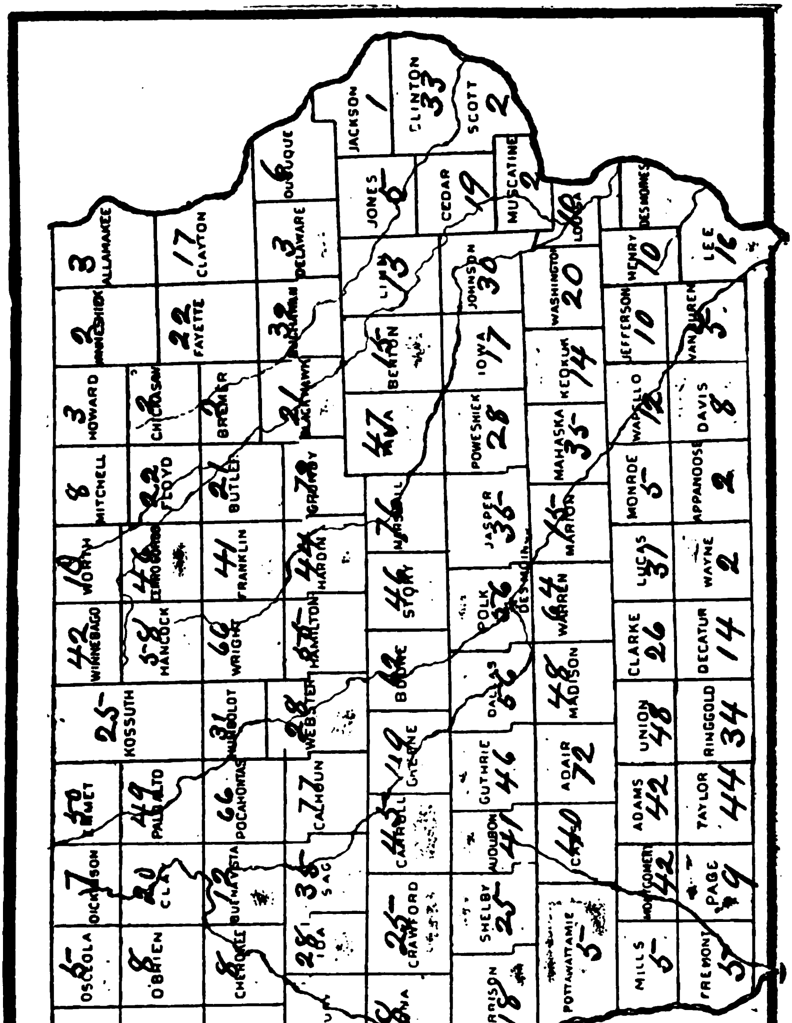
"What percentage of hogs have been lost by cholera?" This inquiry was appended to the blanks sent out to the crop correspondents of the Iowa Weather and Crop Service, and their answers are embodied in the final report of the season. The percentages of loss given have been carefully tabulated, and the result is summarized below.

The average for the state appears to be 30 per cent, which is believed to be approximately correct; certainly not too high. There is a marked variability in the ravages of the disease, the range by counties being from 2 per cent to 77 per cent.

Following are the averages by districts; Northeast district, 7 counties, loss 7 per cent; East Central district, 14 counties, loss 14 per cent; Southeast district, 10 counties, loss 11 per cent. The three eastern districts, comprising 31 counties, lying eastward of a line drawn from west lines of Howard to Davis, show an average loss of only 11 per cent.

North Central district, 14 counties, loss 38 per cent; Central district, 15 counties, loss 52 per cent; South Central district, 13 counties, loss 30½ per cent. The three central districts, comprising 42 counties in a north and south belt, show an average loss of 40 per cent.

Northwest district, 10 counties, loss 16 per cent; West Central district



9 counties, loss 27 per cent; Southwest district, 8 counties, loss 24 per cent. For the western belt, 27 counties, comprising the Missouri slope, the average has been 22 per cent.

From this it will be seen that the disease has caused the greatest loss in the central belt, about five counties wide across the state from north to south. See map above, giving percentage by counties.

The loss to the state is very heavy. Probably the aggregate will amount to 1,800,000 hogs, of all ages, but mostly less than a year old. The indirect loss is also very heavy, on account of the shipment and slaughter of vast numbers of young animals in various stages of immaturity.

The aggregate loss to the state, direct and indirect, can not fall short of $15,000,000 for this single season.

WEATHER CROP BULLETINS.

SUMMARIES OF WEEKLY BULLETINS FOR THE CROP SEASON 1896.

BULLETIN NO. 1, APRIL 7TH.

The past winter was milder than the average with less than the normal amount of precipitation and stormy weather, making favorable conditions for wintering stock. March was abnormally cool and dry, with frequent duststorms.

April came in with a cold wave of considerable severity, with high winds and freezing weather on 1st and 2d, retarding farm work. The temperature has been below normal for the past week. The season is somewhat late compared with the average of recent years. But a fair start has been made in seeding and preparing ground for planting. In the southern districts seeding small grain is about completed. In the central and northern districts sowing spring wheat is nearly completed, with a small increase of acerage compared with last year, and considerable progress has been made in sowing other small grain.

The soil is in fine condition for working and for the reception of seed, with sufficient moisture to start vegetation. While the subsoil is extrmely dry, there is more moisture at the surface than at the corresponding date last year. Fall wheat and rye wintered fairly well, but were somewhat injured by the high winds and freezing weather of the past week. Pastures and meadows come out in good shape, except some damage to clover from the dry weather in the fall. Stock is generally in good condition, and there is an ample supply of forage on hand.

BULLETIN NO. 2, APRIL 14TH.

The past week brought a rare variety of weather, with a notable commingling of winter and summer conditions. A general storm began on the 7th and continued until the 9th, the precipitation in many localities in the northern and central districts taking the form of snow, sleet, hail and rain, the temperature being near the freezing point. This was followed by much warmer weather, with frequent scattered showers, the maximum temperature ranging from 75° to 90°.

Reports from all parts of the state show that the drouth has been effectually broken, the measurements of precipitation ranging from one to four inches. There is ample moisture in all sections and in many localities the soil is thoroughly soaked. The bulk of the precipitation has been absorbed by the thirsty earth. Farm work has been delayed and some seeding of small grain remains to be done in nearly all districts. A fair start has been made in plowing for corn. Farmers are pushing things on all lines with renewed confidence. Grass has made a vigorous start. In the districts where winter wheat is grown reports are generally more favorable. There are indications of an increased acreage of spring wheat, compared with last year, and a probable decrease in the acreage of oats. More that the usual amount of grass seed is being sown. Fruit buds are swelling and no damage is reported.

BULLETIN NO 3, APRIL 21ST.

The high temperature and abundant rainfall of the past two weeks have brought the season forward rapidly to normal conditions, and in some respects it is now in advance of the average. The past week was unusually warm, and all conditions were favorable for farm work and the growth of vegetation. The daily mean temperature ranged from 3° to 15° above normal, the least excess being registered in the northwest section. The rainfall, in form of light showers, was ample to maintain sufficient soil moisture for present needs. Seeding of small grain is now practically completed and fair progress has been made in plowing for corn. With continuance of favorable weather, planters will be in operation before the close of the month. Early sown grain is up, and generally shows a good stand. Spring wheat is especially promising, and winter wheat is generally in good condition in the central and southern districts. But one report has been received of extensive damage to this crop. Pastures and meadows have made rapid growth, and in some sections pasturage is ample for the support of stock. Early varieties of fruit are in bloom in the southern districts, and in all districts the prospect is excellent.

BULLETIN NO. 4, APRIL 28TH.

The daily excess of temperature during the past week ranged from 3° to 9°, and there was an average amount of sunshine The rainfall was considerably above the normal in the northern and central districts. For the month of April the total precipitation is now from 1 to 3 inches above the normal for the state at large, and in all sections there is an ample reserve of moisture in the soil and subsoil. These favorable conditions have brought all forms of vegetation forward with unusual rapidity, and in respect to the growth of plants and foliage the season is now earlier than the average. Oats, barley, spring wheat, fall wheat and rye have been greatly benefited, and in all sections of the state pasturage is now ample for the support of stock.

Farm work has been vigorously pushed and a large area is ready for planting. Some corn has been planted in the southern districts, and with favorable weather this work will be quite general within the coming week. A good beginning has been made in planting potatoes. The light frosts reported on the mornings of the 22d and 23d did no damage, and the fruit prospects continue to be quite promising.

BULLETIN NO. 5, MAY 5TH.

The average temperature for the state during the past week was a little above normal, much the greater excess being recorded in the southern districts The percentage of sunshine was generally far below the normal. The reports show excessive rainfall in the larger part of the state, the lowest measurements being recorded in the south central and southeast districts. Following are some of the highest figures reported: Plymouth, 5.01 inches; Woodbury, 3.93; Webster, 3.52; Osceola, 3.32; O'Brien, 3.22; Jasper, 3.38; Black Hawk, 3.60; Wright, 3.03; Harrison, 3.18; Carroll, 2.58; Crawford, 2.62; Marshall, 2.15; Buchanan, 2.02; Humboldt, 2.20; Franklin, 2.21; Bremer, 2.76; Howard, 2.53; Ida, 2.38; Tama, 2 84. These figures show a wide distribution in the northern and central districts. But there are no complaints of superabundant rainfall, and there are comparatively few reports of damage caused by the heavy storms of the week. It may therefore be set down as another favorable week in this most promising season. Small grain and grasses are doing remarkably well in all sections. Pasturage is abundant, and the hay crop promises to be unusually heavy. Plowing and planting were retarded by the wet weather in all sections where there was an excess of moisture. In the southeast, and portions of other southern districts, about half the usual acreage of corn has been planted; and in all of the southern half of the state a good beginning has been made. Within the coming week, if weather is favorable, the planting operations will be general.

BULLETIN NO. 6, MAY 12TH.

The past week was unseasonably hot and generally dry, with more than an average amount of sunshine and high winds. The daily excess of temperature ranged from 8° to 12°. For the week ending Saturday, the rainfall was but little more than a trace in the larger part of the state. Later reports by wire and mail show that the light showers on Sunday evening extended over a considerable area in the central and northern districts. The southern districts are in pressing need of moisture for the pastures and small grain crops. Conditions were generally favorable for corn planting, and good progress is reported in all sections. In the central and southern districts the work is nearing completion, and by the close of the coming week it will be practically finished in all parts of the state. Early planted corn germinated readily, showing a good stand and color, and the work of cultivation is already well begun in some localities. Grass and small grain have made good advancement, and with timely rains will fulfill their early promise. Chinch bugs are beginning to cause some anxiety in some parts of the southern districts.

BULLETIN NO. 7, MAY 19TH.

The past week was excessively wet and cloudy, with about the normal temperature. Showers have fallen in considerable portions of the state every day since the 9th inst., and in all districts there has been a heavy excess of rainfall. Following are some of the higher measurements reported for the week ending Saturday night: Pottawattamie, 7.75; Carroll, 7.57; Boone, 6.59; Greene, 6.50; Ringgold, 6.36; Mills, 5.26; Union, 5.15; Fremont, 4.31; Osceola, 4.40; Woodbury, 4.41; Ida, 4.15; Wright, 4.89; Cherokee, 4.82; Buena Vista, 5.87; Winnebago, 4.50; Dallas, 3.42; Jasper, 3 34; Palo Alto, 3.28; Davis, 3.60; Tama, 3.66; Marshall, 2.95; Bremer, 3.59; Washington, 3.17; Iowa, 2.82; Clay, 3.93 inches. Adding the heavy showers of Sunday and Monday would give a very great excess during the past ten days. Considerable damage to crops has been done by washing out and flooding in some localities where the heavier downpours occurred.

Corn planting has been retarded, and probably some replanting will be necessitated. In the northern and central districts from 20 to 40 per cent of the corn area remains to be planted, and in some sections the plowing is not completed. The early planted fields show a fair stand, but the weeds are getting a vigorous start. Grass and small grain have made a phenomenal growth. The only drawback is a tendency to rank growth of oats and wheat, which may cause damage by lodging or rust. The hay crop is assured, and will be unusually heavy.

BULLETIN NO. 8, MAY 26TH.

First of the week was cool and cloudy, last half warm, the mean temperature for the week being above normal. The rainfall was generally light during the working days of the week, and the time was well improved wherever the soil was dry enough to plow or plant. Considerable ground remains to be planted in all sections where the rainfall was excessive and the surface low and flat. The acreage planted on bottom lands will be materially lessened. Some progress has been made in cleaning out the early planted fields, but the weeds have made a rapid growth. Cutworms are numerous. The excessive heat and moisture of the season has not been altogether favorable to the best development of small grain crops, especially in sections where the rainfall has been heaviest. Oats and spring wheat show a tendency to become too rank, and there are some reports of lodging. Pastures, meadows, garden vegetables and small fruits are generally excellent.

BULLETIN NO. 9, JUNE 2D.

The temperature the past week was variable, the average for the state being above normal, and the sunshine generally deficient. The rainfall for the week ending Saturday night was unequally distributed, ranging from less than .50 to above 3.50 inches. The heaviest downpours are reported from portions of the east central and northeast districts, where local cloudbursts caused destructive floods. In the larger part of the state the work of planting has been retarded by excessive moisture, and a small percentage of the usual corn acreage remains to be planted. Drying weather is needed to put the soil in condition for completing the work of planting and replanting, and for subduing the weeds that have made a vigorous start in early planted fields. The average condition of all field crops, except grass, has been somewhat lowered by excessive rains. Winter wheat and rye appear to be doing fairly well. Oats, barley and spring wheat show some ill effects of wet weather. But, with favorable weather in the future, all crops may regain their former promising condition. Pastures and meadows are at their best.

BULLETIN NO. 10, JUNE 9TH.

The first half of the week was cool, the last half warm, making the average temperature about normal. There was a large excess of cloudiness, with frequent light showers in many localities, hindering farm work in fields not well drained. On the 5th considerable local damage was caused by cloudbursts in Harrison and Cass counties. Variable reports are received as to the condition of corn. Early planted corn on drained land is doing fairly well, and is well cultivated. The general condition of this crop, however, is below the seasonable average, and the acreage has been lessened by the excessive moisture. In numerous localities planting is not yet completed, and many fields are weedy. Oats and spring wheat are becoming rank, with a tendency to rust, the result of excessive heat, humidity and rainfall. Fall wheat is doing fairly well. Pastures are luxuriant. Timothy and clover meadows are unusually heavy where the stand is good. In old meadows the yield of hay will be much reduced by the encroachment of blue grass. Army worms have appeared in great numbers in numerous localities, their destructive work being mainly done in grass lands.

BULLETIN NO. 11, JUNE 16TH.

The daily mean temperature of the past week was from 3° to 5° below the seasonal normal, and the sunshine was less than the average. The rainfall was unequally distributed; but all sections received an ample supply, and some localities still report an excess of moisture. The lower temperature has been beneficial in checking the tendency of oats, wheat and barley to rust and lodge, from which these crops have been materially damaged in all sections of the state. Considerable progress has been made in cleaning the corn fields, and the crop is doing fairly well in well drained fields. The planting season has covered a period of over six weeks, and there is a wide range in the size and general condition of the plant. Clover cutting is in progress in all districts, and some timothy meadows have been cut. Clover is heavy, and new meadows generally promise a liberal yield of hay. All reports indicate a light crop in the old meadows. Potatoes and pastures are heavy.

BULLETIN NO. 12, JUNE 23D.

Ideal weather conditions prevailed the past week in the larger portion of the state. The daily mean temperature ranged from 3° to 5° above the seasonal normal, and the amount of sunshine was sufficient. The rainfall was generally light, except in portions of the north central, northeast and east central districts, from which reports are received of heavy local showers. There has been but slight interference with farm work, and good progress is reported in the cultivation of corn and hay making. Corn is generally clean, and in some of the southern districts the early planted fields are being laid by. The corn fields and clover meadows are pushing the farmers, and the harvest of fall grain is close at hand. Some improvement is noted in the prospects of spring grain, especially in sections where dry weather has prevailed, which has checked the tendency to lodge and rust. Complaints of predatory insects have about ceased, and the general tone of reports is more cheerful

BULLETIN NO. 13, JUNE 30TH.

The temperature of the past week was favorable for all crops, although slightly below the seasonal normal. The rainfall was unequally distributed, numerous localities reporting heavy thunderstorms, with wind squalls of considerable force, on the 24th and 25th. In all sections there is an ample supply of moisture in the soil for the present needs of the crops. Reports from all districts indicate that corn is making good advancement, and a large portion of the crop will be laid by during the coming week. The late planted and replanted fields give promise of producing a fair crop. Oats suffered material injury in all sections visited by heavy rain and windstorms, a portion of the rank grain being lodged beyond recovery. The full extent of damage cannot as yet be estimated. There are numerous reports of damage to spring wheat by rust. The harvest of hay and fall grain is in progress, and a considerable acreage of barley is about ready for the reaper. The yield of hay is generally satisfactory. Pastures yield abundantly, and the prospect for potatoes was never better.

BULLETIN NO. 14, JULY 7TH.

The high temperature prevalent during a portion of the past week was modified by more than the normal amount of humidity and cloudiness, and timely showers favored the rapid growth of vegetation. The rainfall was generally sufficient, and numerous localities report amounts much above the seasonal normal. The widely extended rain and windstorms on the 2d and 3d caused a material increase of damage to oats and spring wheat by lodging and rust wherever the growth of straw is excessively heavy. Corn has made fine progress in all sections, being mostly laid by in good condition. The harvest of winter grain is practically finished; the cutting of barley is general, and, in the southern districts, the oats harvest is begun. Hay making has been delayed in some localities by cloudy and damp weather. Hay crop generally heavy, but the acreage is below the average of former years.

BULLETIN NO. 15, JULY 14TH.

The past week was cool and dry. The daily average temperature was about 3° below normal, and the rainfall barely exceeded a trace in any part of the state. The days were generally bright and warm, but the nights were cool. It was ideal harvest weather. Hay is generally well secured; the winter grain crops are in the stack or threshed; barley is about all cut in the southern and central districts; the oats harvest is in progress in all sections, the ripening being hastened by rust.

All reports show extensive damage to oats by rust and lodging, and in the southern and central districts the prospective yield will scarcely repay the harvesting of a large percentage of the area planted. The northern districts suffered least damage from that cause, but the yield will be cut short in all sections. Spring wheat has been materially injured by rust, but the condition of that crop is much better than that of oats. Corn has made steady advancement in all districts, and its condition is now well up to the normal. Rain is needed in moderate quantities for the pastures, potatoes, corn, and the minor crops, though no material damage has yet resulted from the dry weather of the past ten days.

BULLETIN NO. 16, JULY 21ST.

From the 13th to the 16th the weather was excessively hot and dry, causing some apprehension of damage by hot winds and drouth. This heated term was followed by much cooler weather and copious showers fairly well distributed. The southern and central districts received the heaviest amount of rainfall, the reported measurements ranging from one to five inches. These showers came in good time, and have been of immeasurable benefit to corn, late potatoes, pastures, gardens and all immature crops. The reports show that good progress has been made in the harvest fields, and by the close of the present week the bulk of small grain will be in shock or stack. Threshing from shock has been begun in all districts with quite variable results. All reports agree that oats are both short in quantity and deficient in weight. Judging by returns thus far received the output for the state will be less than one-third the heavy yield of 1895. Corn is very promising, and received no material damage from the late hot and dry weather.

BULLETIN NO. 17, JULY 28TH.

The week ending Monday, the 27th, was unusually cool from the 22d to the 26th, and the amount of rainfall probably exceeded the aggregate received during any week of the current season. The special corn and wheat stations report the following amounts: Marshalltown, 5.07 inches: Hampton, 3.32; Clinton, 4.41; Charles City, 1.59; Fairfield, 2.53; Maquoketa, 3.53; Iowa City, 2.69; Forest City, 1.40; Waterloo, 4.46; Ogden, 4.08: Cedar Rapids, 3.40; Osceola, 4.21; Centerville, 3.65; Des Moines, 3.67. Numerous other stations give similar reports. This has made very unfavorable conditions for harvesting and threshing, and grain in shock has suffered material injury Oats received the greater damage, reducing still lower the condition of this unfortunate crop. A short period of dry weather is now much to be desired, to give opportunity to save the unstacked grain. Corn is generally reported in good condition, and there is an ample storage of moisture in the soil to develop and ripen the early and late planted fields. The weather has been very favorable for late potatoes and pasturage, and all immature vegetation.

BULLETIN NO. 18, AUGUST 4TH.

The temperature of the past week was about normal, but the rainfall was excessive and amount of sunshine deficient. For the week ending August 1st, the following are among the heavier amounts of rainfall reported: Dubuque, 5.84 inches; Shelby, 5.13; Butler, 4.85; Jasper, 4.76: Poweshiek, 4 68; Delaware, 4.53; Boone, 4.15; Story, 3 93; Marshall, 3.85: Iowa, 3.53; Carroll, 3.44; Black Hawk, 3.58; Polk, 3.53; Van Buren, 3 49: Tama, 3.31; Jackson, 3; Bremer, 3.33; Woodbury, 2.85; Lee, 2.92; Muscatine, 2.50; Clayton, 2.65; Guthrie, 3; Webster, 2.85; Crawford, 2.54; Pottawattamie, 2.35.

The weather conditions have been very unfavorable for completing the work of stacking and threshing from the shocks. And as a result of the frequent and heavy rains of the past two weeks the unsecured grain has been materially injured by rotting and sprouting. Oats suffered the greater damage, but spring wheat has also been badly hurt. Numerous reports state that stacks of grain have been considerably injured by excessive downpours and heavy winds. Corn is doing notably well, except in some localities where it was broken down by wind and hailstorms on the night of the 26th. On the whole this crop is very promising, and the bulk of it is now in the roasting ear stage. Pastures and meadows show a luxuriant growth.

BULLETIN NO. 19, AUGUST 11TH.

This has been the warmest week of the season, the daily mean temperature ranging from 5° to 8° above normal. The rainfall was very light during the working days of the week, with the exception of heavy local showers in Appanoose county and some other portions of the south central district. On Saturday night and Sunday night the high temperature was somewhat alleviated by showers with high winds, extending over the greater portion of the state. Some damage to corn is reported from various localities, but the aggregate of loss will not be heavy. Considerable progress has been made in securing the unstacked grain, and threshing has been resumed with varying results. Corn is generally doing remarkably well. The greater portion of the early planted corn is well advanced in the roasting ear stage, and much of it bids fair to be ripe enough to cut before the close of August.

BULLETIN NO. 20, AUGUST 18TH.

High temperature prevailed the first half of the week, which was followed by cooler weather, making an average a little above the normal. The amount of sunshine was below the average. In the larger part of the state showers were frequent, and many localities report excessive rainfall with windstorms of considerable severity, causing some damage to corn and grain in shock and stack. The conditions have been generally unfavorable for securing the unstacked grain, and the aggregate of loss to oats and wheat will be very heavy. The corn crop is so bulky, and generally so well advanced that the local damage by wind and hail will not materially reduce the heavy yield that seems now to be assured. The crop is generally ten to fourteen days early and a large percentage will be practically safe from frost by September 1st. The late planted fields will need four or five weeks favorable weather, to reach full maturity. A good start has been made in fall plowing where the soil is sufficiently dry. There is great need now of a long spell of good old fashioned dry weather, such as we used to have in the pioneer days.

BULLETIN NO. 21, AUGUST 25TH.

The week has been unseasonably cool and cloudy, with an excess of rainfall in the larger part of the state. The weather conditions have not been favorable generally for threshing and for ripening the immature crops. Corn is doing fairly well, however, and, if the coming month is as favorable as usual, the quality of the crop will be better for this extension of the ripening period. If a killing frost does not arrive in advance of its normal time, the crop of 1896 will probably break all former records in the yield per acre, though the area harvested will be less than in some former years. A considerable part of the early planted corn will be practically beyond danger of harm by frost by the 15th of September, if it is not further delayed by cool and wet weather. The late planted fields will need four to five weeks of seasonable warmth, sunshine and dryness to fully mature their immense burden of corn. Pastures are excellent, and the meadows are bringing forth a heavy second crop of grass. The yield of clover seed promises to be large. There are numerous indications of shortage in the late potato yield. Hog cholera is beginning to assume a dangerous form in scattered localities.

BULLETIN NO. 22, SEPTEMBER 1ST.

The past week has been cool and dry, with more than an average amount of sunshine. The daily mean temperature was from 2° to 4° below the seasonal normal. Light frosts occurred in numerous localities on the mornings of the 26th and 27th, but no damage is reported. The weather has been quite favorable for farm work and for maturing the unharvested crops. Corn is ripening slowly, under the most favorable conditions for its normal development. Reports from all districts indicate that a considerable portion of early planted corn is now practically safe from damage by frost. Probably about 60 per cent of the whole acreage planted will require two or three weeks of good weather to reach complete maturity. Threshing is nearing completion, and plowing has progressed rapidly, with good conditions of soil. A considerable acreage is ready for fall seeding. A heavy second crop of hay is ready to harvest. Pastures are fine, and fall feed will be unusually abundant. The yield of flax is generally good. Reports of the potato crop are quite variable, and the prospect is not favorable for an average yield.

BULLETIN NO. 23, SEPTEMBER 8TH.

The past week was cooler than usual, with about the average amount of sunshine and generally light rainfall. The temperature fell dangerously near the frost line on two mornings, but as yet no damage has been done. Corn has made fair progress toward maturity, under favorable conditions for the full development of the grain. Some cutting in early planted fields has been done, and probably more than 50 per cent is ripe enough to cut. While a considerable acreage is practically safe, yet, if a killing frost comes before the 25th inst., there will be more than the usual amount of soft and immature corn harvested this season. To round out the entire crop, all of September is needed, with normal temperature and sunshine. In the sections where fall grain is grown, good advancement has been made in plowing and seeding, under excellent conditions. Nearly all reports indicate a large output of clover seed. Reports as to the potato crop are quite variable, with frequent mention of damage by rotting. Threshing is nearing completion, and the harvest of prairie hay is in progress, with a fine yield. There are numerous reports of hog cholera.

BULLETIN NO. 24, SEPTEMBER 14TH.

The mean temperature of the past week was about normal, and there was a large excess of cloudiness and damp weather. The rainfall was in excess in scattered localities, but the average for the state was below normal There were but three favorable days for ripening and drying out the corn, but the general condition is fairly good. Reports indicate that the bulk of the crop is practically safe in the northern districts, wherein it is generally farther advanced toward maturity than in the central and southern districts. Cutting is in progress in all sections, and in the dairy districts a large portion of the crop will be cut and shocked within the coming week.

For the complete ripening of the full crop of corn we need from ten days to two weeks of dry, warm weather. From 20 to 30 per cent was planted later than usual, and much of this is still green and quite immature. The potato harvest is begun, with a variable output. Dry weather is needed for harvesting and hulling clover seed. Fall plowing and seeding are being rapidly pushed. More than the usual area will be plowed, the conditions of the soil being favorable.

SPECIAL BULLETIN, SEPTEMBER 22D.

The past week was unseasonably cold, wet and cloudy. The daily mean temperature was 2° to 4° below normal, and the rainfall was largely in excess in the greater portion of the state.

On the mornings of the 19th and 20th heavy frosts were reported in numerous localities in the northern and central districts, with temperatures low enough to form ice in many places. The extent of damage to corn can not as yet be estimated. It is certain, however, that a considerable portion of late planted corn is yet soft, requiring warm, dry weather to become sound and merchantable. There has been thus far in September but little favorable weather for ripening the belated portion of the crop; and the low temperatures and excessive moisture have been detrimental to both early and late corn. With more favorable conditions in the near future a large yield may be harvested; but it cannot reach the high aggregate that would have been secured if normal weather had prevailed for the past three weeks.

Reports indicate that the potato crop will fall considerably below the large output last year.

SPECIAL BULLETIN, SEPTEMBER 29TH.

The temperature of the past week was about 40° below normal, and the deficiency for September to date amounts to over 100°, with a large excess of cloudiness and moisture.

These unfavorable conditions, with severe frosts, have checked the ripening of belated corn, comprising probably 15 to 20 per cent of the entire acreage. This will somewhat reduce the aggregate of the crop, which a month ago promised to break all former records. But with drying weather in the future the total yield of sound corn will fairly sustain the reputation of the leading corn state.

The late potato crop is not likely to reach an average yield.

Fall pastures are extra good. The growth of grass and vegetation generally has been phenomenal.

WEATHER AND CROP NOTES.

FROM MONTHLY REVIEW, JULY, 1896.

The spring and summer of 1896 will score a high record among the wet seasons of this region. It is the more notable from the fact that it follows so closely a period of excessive dryness. For study and comparison we give below a table showing the average rainfall in inches for this state in the months of April, May, June and July, for the years from 1890 to 1896 inclusive:

YEARS.	APRIL.	MAY.	JUNE.	JULY.	TOTAL.
1890	1.78	3.56	7.76	1.98	15.08
1891	2.15	3.18	5.39	4.22	14.94
1892	4.75	8.77	5.19	5.29	24.00
1893	4.21	3.45	3 91	8.33	14.90
1894	3.07	1.87	2.67	.63	8.24
1895	2.62	3.19	4.32	3.40	13.53
1896	5 02	6.69	3.11	6.90	21.72
Normal	2 60	4 15	4 95	4.30	16 00

It will be observed that 1892 and 1896 score the highest records for excess of rainfall during these four critical crop months The normal or average amount for this state is sixteen inches for the four months, and in the seven years there has been a deficiency in five seasons and an excess in two seasons. And the best average crops have been grown in the seasons when the rainfall was an inch or two below the normal. To show the relation between rainfall and production we give below the average yield per acre of some of the staple cereal crops of this state in the six years, 1890 to 1895, inclusive:

YEARS.	Corn—bushels.	Oats-bushels.	Wheat winter—bushels.	Spring wheat—bushels.	Barley—bushels.
1890	28	29	16	11	24
1891	38	40	20	15	22.5
1892	29	25	17	12	24.3
1893	35	28	15.4	12.4	22.[illegible]
1894	12	24	16.7	12.8	1[illegible].4
1895	38	48	22	17	33

Since 1890 the greatest crops have been harvested in the seasons of 1891 and 1895. By reference to the first table it will be seen that the rainfall in the four crop months of those years was uniformly moderate, and a little short of the normal. The year 1895 brought the best all-round harvests, because the soil had been thoroughly drained and pulverized by the drouth that prevailed in the summer, fall and winter of the preceding year. And upon this well prepared soil there came moderate showers with sufficient frequency to keep the crops growing at their best. In the greater part of the state the rainfall was ample, though the total was two and one-half inches below the normal It appears that our best crops are grown in the seasons closely following a drouthy period, or just before the opposite extreme is reached.

The oats crop shows the ups and downs of the seasons, with but two good crops in the seven-year period. The yield was better in respect to quality in the extremely dry season, 1894, than in the excessively wet seasons, 1892 and 1896. Excessive heat and moisture in May and June will always knock out oats. And other small grain crops suffer in hot and wet seasons.

The rainfall for the four months—April 1 to August 1, 1896—amounted to as much as the total precipitation for the full year 1894. It has been excessively wet in both seed time and harvest, making it muddy in sowing and "catchy" in reaping. This is an exceptional experience in this section, our wet springs being usually followed by dry periods in mid-summer. It's a marvelous change from an average monthly rainfall of about 2 inches in 1894, to 5.50 inches per month in 1896. What does this signify? Shall we adopt the method of reasoning that has been in vogue in recent dry years, and jump to the conclusion that the people have caused a change of climate by doing something they ought not to have done, or leaving undone something they ought to have done? Is it true that this region is going to be permanently wet? Will it keep on raining. filling up the ponds and streams, making more vapor to make more showers to be again evaporated and precipitated continually? Have we ruined our climate by planting too many groves, hedges and shelter belts, thereby drawing the rain clouds from long distances to drench our fields with excessive downpours? If the work of man caused the drouth in 1894, shall we not infer that the people are in some way responsible for the excess of moisture in the year of grace, 1896?

No, we think the plea of not guilty could be sustained in any court of competent jurisdiction. The people are not to blame either for excessive rains cr parching drouths. Don't chop down trees, or clear off sheltering groves, on the mistaken supposition that they bring too much wet weather. That would be as foolish as tearing out tile ditches or damming up creeks to cure drouths. The causes of extremes, or variable seasons, are far above and beyond the reach of human hands Only the Omnipotent is able to grasp and wield these mighty forces of nature.

This country is not going wet, except at intervals. In due time the pendulum will swing to the opposite extreme, and the lowlands, lake beds and bottoms of sloughs will dry up and once more become arable. Don't be discouraged with these occasional wet seasons. We shall have good, old fashioned, dry summers in the near future to teach us profitable lessons of economy and the proper cultivation of the soil. They are sure to come about as often in the future as in the past fifty years. Don't worry about any change of climate, but so watch and work, and apply brains to your work, that you may reap abundant rewards for your labors in every season, whether wet or dry. This may be done, and the coming farmer will learn how to do it.

Many people take pleasure in seeing the ponds filling up, and the streams again running bank full, after the fashion of the pioneer days in this country, before the impervious old prairie sod had been broken. But they do not observe that these swollen streams are swiftly bearing away thousands of tons of the most fertile matter washed from our fields. Take note of the marvelous productiveness of the low lands that are replenished by spring and autumn floods, where the murky waters deposit their rich burden of fertilizing material year by year. All of that cream of the soil has been washed from the surface of uplands and slopes; and over 95 per cent of the richness is carried to the sea and is a total loss to the soils. We take pleasure in seeing well filled streams, but we much prefer to note the flow of clear, sparkling waters. When all the fields are properly tiled the flowage of streams is lessened, and the waters that find their way into the larger streams, and thence to the sea, are not so heavily burdened with the elements of fertility. On all accounts it is better to carry away the surplus waters through deeply laid tiles than over the surface. By deep culture, subsoiling where it is necessary, and thorough deep tile drainage, we may conserve all the water that can be retained, and get rid of excess with the least damage to our fields.

VALUE OF WEATHER OBSERVATIONS.

Prof. Lorin Blodget, of Philadelphia, recently contributed the following article to the Monthly Bulletin of the Pennsylvania Climate and Crop Service:

"The practical value of climatological observations is now as clear and definite as any branch of the public service whatever, and it cannot be suspended at any time without serious loss. The business interests of every part of the state have come to the point of adapting themselves to the current daily reports of changes, the forecasts made by the National Weather Service, and the comparison of the fixed conditions of climate, determined chiefly by the state services; and this well-earned position of influence and character of authority attached to both departments of the weather service cannot be dropped nor permitted to fail in the current and continued work each has in charge. The state has a duty, as well as the general government, and the body of faithful observers who have furnished records for so many years should be sustained and rewarded to the fullest possible extent.

"It is now almost half a century since the general service of reporting observations of the climate began. It was done earlier by order of the surgeon-general at the military posts and the New York academy, while in this state—Pennsylvania—the Franklin Institute invited co-operation in recording the temperature, rainfall, etc., as early as 1839. From 1848 to 1858, the Smithsonian Institution, at Washington, made extensive preparations for a national system of observations, which, however, produced little in practical results and was practically abandoned in 1858. In 1871, General Myer began the present system of storm and weather reporting. He founded the Weather Bureau, and the singular vigor and practical accuracy of his work attained universal approval, securing from congress full recognition as a permanent executive bureau in the public service. In recent years this branch of the national service has developed greater skill and accuracy than was believed possible, especially in the forecasting and in the forms employed in current illustrations. The public feels its daily value and is conscious of its absolute need of the service rendered.

The several state systems hold a position in respect to the national system much as the state governments do to the general government. They are indispensable as aids and adjuncts to each other, and the state work covers a wide field that the national bureau cannot reach. Each county and each district should be examined and its climate defined. Its productive capacity as to cultivation, its forest growth, its healthfulness, and all other conditions, should be defined by instrumental record and by the establishment of both the mean and the extreme conditions. And, in respect to the range of these extremes, it is certain that continuous records must be made, and that no definitions as to one season or year will practically apply to the next season or year. The sources from which the very atmosphere comes in its annual movement are as remote, practically, as is the sun as the source of atmospheric heat.

"We have a duty of the broadest and most practical character in thus observing and determining the climate of the state in all its conditions. It is a duty scarcely less imperative than that of providing for the well being of its inhabitants through the ordinary functions of its state government. The work of the service is not speculative nor theoretical as to any of its conditions. Its duty, primarily, is to make permanent records of the facts, and this for as many localities as may be possible, or may be required, to define the climate of every habitable area within the state limits. The difference due to elevation, as well as those of geographical position in other respects, are among the points that should be better known than they now are.

"The sweep of the greater changes and storms that pass over the entire country can better be shown in the work of the national bureau, but there is a share of duty, even in this respect, falling to the hands of the state."

DISTINGUISHING A TORNADO.

HARPERS' WEEKLY.

Perhaps the most important distinction to emphasize is that between the appearance of a thunderstorm and a tornado, since, if this can be defined, much needless fear at the approach of black but harmless thunderstorms can be avoided. When not combined with tornado manifestations the thunderstorms send aloft a narrow line of black clouds in advance, which remain high in the air. At the right and left the black clouds seem to reach the earth, but this is caused not by descent to the earth, as in a tornado, but by distant edges of the high black clouds receding below the horizon. It is one storm which spreads to the left and right. There is no splitting up of clouds with the formation of a different storm at another part of the horizon.

The tornado is easily distinguished from this perfectly plain edge of black, with its lighter rain mist extending to the earth. Whether the funnel is veiled by rain or not it is ordinarily so black that as it approaches it appears as a column of dense darkness, narrowest at the earth, with light breaking through on either side of it. The most marked trait of all is that other clouds seem to be approaching, others moving at right angles, and a distant storm of light hue is coming from the southwest. This is all caused by the tornado, which is drawing clouds and air currents toward itself from great distances. As the tornado funnel comes nearer, with its dark mass of rubbish reaching to the earth, the roar is frightful, giving the observer fifteen or twenty minutes' warning. The southwest corner of the cellar, if the tornado is approaching from the south or west, is the safest place of refuge. The tornado carries the wreckage to the north and east, and if the funnel is seen in the north or east it need not be feared, because it will almost certainly move away. Of 600 tornadoes specially classified, all but thirty-five moved from southwest to northeast, and nearly all of the thirty-five moved eastwardly.

The funnels have a rotary motion from right to left, and this motion is not due to electrical action, but to acceleration of conflicting air currents. Lieutenant Finley shows that the lightning supposed to be in the funnel is really in adjacent thunder clouds. The broken and withered buds bruised by the action of the air are evaporated by the sun after the tornado, causing the foliage to look seared, giving rise to the error that the tornado manifests burning electrical power. It has been demonstrated by study of wreckage that as the funnel leaves the earth and rises into the air its force slightly diminishes, and that this bounding motion causes the funnel to spare one building and demolish another. The funnel, with its small end to the earth, spins like a top, moving along at an average rate of about forty miles an hour, but the velocity of the spin is incalculable. It is like the motion of air impelled by an explosion.

Tornadoes generally occur between 1 P. M. and 5 P. M., and not one in a thousand takes place between 10 P. M. and noon of the following day. I have heard of only two instances in which the tornado occurred between midnight and morning—one at Hohokus, N. J., and another in the southern part of Michigan, which caused slight loss of life. Since these are only two in about 2,000 cases, the danger from tornadoes at night is so small that it need not be considered.

COLD WAVES IN FORMER YEARS.

Some of the old-time weather records do not appear to sustain the current notion that the work of man on this continent, in the cultivation and drainage of the soil and clearing away portions of the primeval forests, has developed a tendency toward climatic extremes in form of floods, drouths, cold waves, hot winds, etc.

The winter of 1894-5 was unusually severe in the Gulf states. Zero temperatures were recorded in northern Alabama and Georgia, and killing frosts reached the Gulf, resulting in the wholesale destruction of orange orchards far to the southward in the Florida peninsula. This was said to be an unprecedented incursion of the cold waves and winter blizzards into that favorite paradise of northern tourists, and some writers gravely assured us that the extreme effects were produced by clearing away some of the timber in the northern sections of the Gulf states.

The old-time weather records, however, show that severe cold waves and killing frosts occasionally visited that region in the first half of the present century, before the forests had been disturbed. In the Climatology of Alabama, by Prof. P. H. Mell, we find the following notes compiled from the reports of the Smithsonian Institution and other reliable weather records:

"1832. A winter of great severity. At Huntsville, Ala., the thermometer registered 9° below zero."

"1834-5. These were both cold winters. February 6 and 7, 1835, were exeedingly cold, the temperature being 6° at sunrise."

"1852. Thermometer registered 8° at Mobile, January 20th. The spring was cool, inclement and late."

"1855-6. The winter was the coldest since 1852. Standing water near Mobile was frozen hard enough to permit of skating—a most unusual sight for that latitude."

In 1877 the Bigbee river was frozen over in January. In the winter of 1884-5 the frozen condition of the ground hindered farm work in Alabama. In December, 1886, the temperature in northern Alabama fell to 6° below zero. Snow covered the northern counties to the depth of 20 inches, and 12 inches fell in the southern part of the state. In the January following the cold was severe enough to kill cattle that were not sheltered.

These records indicate that the tendency to extremes in temperature is not of recent origin. Northern Alabama, it should be noted, is quite heavily timbered; yet the cold waves are tall enough to climb over the tallest trees in that region. In matter of fact, cold waves tumble downward from the crests of advancing "highs." It would require a mighty big wall of hills and trees to shut them out.

The New York *Sun* recently published some interesting reminiscences of old-time winters and sudden onslaughts of cold waves, related by an octogenian, who was one of the pioneer settlers in Illinois. The old gentleman said:

"I was an Illinois pioneer. My folks settled in a piece of timber in McLean county, known as Keg Grove. The city of Bloomington occupies the site of Keg Grove now. We settled there in 1829. There were only 40,000 people in the whole state of Illinois then. Neighbors were few and far between about Keg Grove.

"The fall and early winter of 1830 were very dry and mild. Late in December, and with very little warning, snow began falling. It didn't fall, either; it tumbled. It came down in regular ready-made snow-banks, and continued, without a moment's let-up, for two days and nights. You may have some idea of how deep the snow fell when I tell you that when it went away in the spring the stumps of trees that had been cut for firewood, as the choppers stood on the snow during the winter, were seven feet high, that being as low down as the choppers could get at the trees. In going to a neighbor's I drove over the tops of their orchard trees and did not know it. It was a fortunate thing that the corn crop had been good that year, for so many families were so blockaded by the snow that they could not get out of their houses. They would have starved to death, but they lived on corn, which they pounded into coarse meal or hominy, and that was so generally the case that the winter was ever afterward known to the pioneers as the hominy winter.

"There was heavy frost every month in the year after that deep snow. Corn couldn't ripen, and there wasn't enough gathered for seed to plant the next season. There wasn't a bushel of seed corn to be had nearer than Ohio in 1832. It cost $3 a bushel. John Duffy came in that year with a few bushels of small, yellow corn from Pennsylvania. That was planted. It was matured early, and some people out there raise Duffy corn yet.

"But in December, 1836, the prairie pioneers got some weather that made them quit dating things from the winter of the deep snow. The month had been warm and moist. Everything was slush and slop and mud. Suddenly the wind began to blow a gale. It came out of the northwest, and no wind that ever swept over those prairies, before or since, came so near being a blast from the north pole as that one was. Almost instantly the mercury dropped from 40° above to 20° below zero, and the falling rain was turned at once to pellets and barbs of ice. The damp air froze so quickly that it became one great cloud of flying frost.

"This polar blast swept down upon us at 3 o'clock in the afternoon. John Dawson was on his way from Williams' mill, six miles down Salt creek. He had gone half a mile from the mill when he heard a roar like thunder. The noise was behind him. Looking around, he saw the storm coming and the rain freezing before it. When it struck him, he turned to go back to the mill. The slush had been more than fetlock deep. By the time Dawson had urged his horse around a hundred yards, the slush was frozen so it bore the horse's weight, and it was with great difficulty that Dawson got back to the mill, the water in the road having become such a glare of ice that his horse could scarcely make his way over it.

"Fowls that were out on soft ground while this unheard-of change of weather came were frozen fast where they stood. Cows froze in their tracks. Our folks had three hogs frozen to death while they were hurrying from their feeding-places to their pen, less than 300 yards away.

"That cold snap lasted six weeks, and was a spell of weather that made folks shudder whenever they thought of it, even in summer-time, for many a year afterward."

WEATHER MAPS—HIGHS AND LOWS.

In the *National Monthly Weather Review* Prof. A. Cleveland Abbe explains the meaning of some of the lines and terms on the daily weather maps. He says:

"The words 'high' and 'low' are used as contractions for 'high pressure' and 'low pressure.' Inasmuch as atmospheric pressure is measured by the barometer, these expressions are also equivalent to saying that the column of mercury in the barometer is a tall one or a short one. If a syphon barometer is used, the top of the long column is above the top of the short column by a larger or smaller amount; the difference in height between the tops of the long and short column is usually more than 30 inches when the pressure is high and less than 30 inches when the pressure is low and when the station is near sea level. If an aneroid barometer is used, the index or pointer usually turns toward the right hand for higher pressures and toward the left hand for lower pressures.

"The map shows, by means of isobaric-lines, the regions where the pressure is the same. Some of these isobars inclose a region of high pressure and others a region of low pressure. High areas are the regions of high barometic pressure. With the high areas we usually associate cool or cold, dry, clear weather and gentle winds. With the low areas we usually expect warmer, moist, cloudy, and rainy weather and strong winds, and sometimes also thunderstorms, tornadoes and hailstorms. Therefore the low areas are sometimes spoken of as storm centers.

"The term barometric pressure or simply barometric readings is often used without realizing its meaning in meteorology. Ordinarily we appreciate the temperature of the air by our personal sensations so clearly that when we see a record of 100° F., we instinctively think of the heat and the temperature, and the most ordinary meteorological observer doubtless sees in his mind's eye the relative levity or buoyancy of the air, due to the fact that it is expanded by high temperature. But our nervous organization is not generally sensitive to the ordinary changes of atmospheric pressure; we have not a mechanical sense to tell us of the pressure or push of the ordinary air. Occasionally one will be found whose ears ring when the atmospheric pressure is high or whose nerves pain him when the pressure is low. To the meteorologist, however, the expression high or low pressure conveys an idea of force exerted in compressing the atmosphere and of expansive force within every cubic inch by which it tries to enlarge its boundary. To him a high barometer means that the air is being condensed by pressure, and *vice versa* a low barometer that the air is expanding by reason of the relief of pressure. The pressure ordinarily exerted by the atmosphere is about 15 pounds to the square inch. This pressure would balance the weight of a column of mercury 1 inch square and 30 inches high. This is the pressure that is holding every cubic inch of our lower atmosphere within its bounds; if the pressure relaxes the cubic inch of air expands. If, for instance, the weather map shows that a region of low pressure is advancing upon any station, the observer may expect to find the air within any confined space pushed outward through every possible aperture; the air in the soil comes up; that within a cavern pushes out through the entrance; bubbles of air in liquid expand in size; hermetically sealed cans bulge outward. These and similar phenomena show the observer that the pressure of the atmosphere upon all bodies at the surface of the earth has diminished and that internal pressures that before were counterbalanced by the atmospheric pressure now have the preponderance. The force that pushes the air forward when the wind blows is this atmospheric pressure of about 15 pounds to the square inch, or rather it is the difference in atmospheric pressure, since the full pressure of 15 pounds to the square inch could only come into play when the air or wind is blowing into an absolute vacuum.

"The motion of the wind is the result of pressure from behind just as truly as is the motion of the piston rod of a locomotive engine. The piston usually has the atmospheric pressure of 15 pounds to the square inch on one side of it and the steam pressure of 100 or 200 pounds to the square inch on the other side, and this great difference of pressure is necessary in order that so small a piston can do so much work. The pressure and the action of the steam engine piston are intense. On the other hand, in the atmosphere a small portion of air moving along as a rapid wind has a very little excess of pressure in the rear over that in front. A vertical sheet of air one foot thick moving forward as the front of a violent gust may, for instance, have a pressure of 29.50 inches in front and 29.51 inches in the rear; this difference of .01 of an inch is about 1-2950 of the whole pressure; or about .005 pounds per square inch, or .72 pounds per square foot. Now, a cubic foot of air weighs about .07 of a pound, and as the above force is continuously pushing this mass, it soon gives it a great velocity, and maintains it at that velocity by continuously overcoming friction and other resistances. The atmospheric pressure pushing from all sides toward a region of low pressure soon sets the air into a whirling motion: it may be on a very small scale, forming a waterspout or a tornado that would scarcely make any show on our daily weather map, or it may be in great whirls, such as constitute hurricanes or other cyclonic storms."

ATMOSPHERIC WAVES.

It is rather startling to be told on high scientific authority that we are living most of the time, submerged in waves to which the greatest waves of the ocean are mere ripples in point of size. This a suggestion or discovery of the late Professor Hemholtz, of Berlin, and the enormous waves are waves of air.

When a current of air blows across a water surface, water waves are produced, and when a current of air blows across a surface of quiet air, or air having a different motion from the first current, then air waves will be produced.

These atmospheric waves, Professor Hemholtz showed, have all of the phenomena of water waves—troughs, crests, foaming, breaking and spraying. But since the qualities of air and water are so different, the air waves have dimensions over 2,500 times those of the corresponding water waves.

Thus the great ocean waves of perhaps twenty-five feet in height would have atmospheric counterparts extending upward a distance of ten or twelve miles above the earth's surface. The passage of the huge air waves would be felt by us, since they would cause a stirring up of the air at the earth's surface somewhat similar to that produced by the passage of water waves over shoal places.

The undulating movement of such air waves would account in part for the intermittent gusts of wind which we notice so frequently in storms.

The presence of these waves is also indicated by the existence of certain kinds of regularly formed cloud groups, in which each cloud marks the crest of an air wave.

This meteorological conception of the great German scientist opens up to observers a very interesting field, and the mere statement of his theory enhances the interest with which we all gaze into this thin medium wherein we live and move and have our being.—*F. Waldo.*

The general causes which act on the movement of the atmosphere are defined by Professor Cornu, in an address lately delivered before the British Royal institute, as gyratory influences, and, when once the movement is set going, it continues of itself and sometimes increases in amount. In the first place, Professor Cornu declares, the movement of the rotation of

the earth is to be cited, which always brings with it a small component of rotation for a displacement of a gaseous mass in latitude or altitude, and, in the second place, and as decisive a cause, the solar heat, which warms the air near the surface, or the clouds. Thus related, and as the ascending tendency of the heated gas cannot be equal over the whole surface exposed to the rays of the sun—as much because of the nature of the ground as because of its inequalities—the equilibrium is upset in parts and gaseous columns ascend. When once gyration is established, the causes producing it keep it up and augment it.

CLAYTON COUNTY RAINFALL RECORDS—46 YEARS.

(From records kept by Hon. Maturin L. Fisher and Frank Larrabee.)

YEARS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total for each year.	Total, each decade.
1850	.15	15	60	1 64	1.70	8.12	8 89	3.43	1.32	1.86	3.04	.85	31.75	
1851	.76	1.48	.90	1.13	10.67	4.89	6 57	5.43	2.90	.54	1.97	.70	28.94	
1852	.39	.23	4.16	3 21	1.56	3.44	4.13	2.18	1.67	3.59	2.56	2.35	29.47	
1853	.80	1.05	.18	4.83	6.59	4.44	5 57	3 55	2.12	.29	3.15	1.05	33.62	
1854	.40	.50	2.47	.99	7.10	7.49	6.55	2.65	2.01	1.84	.44	.17	32.67	
1855	.95	1.21	1.41	1.57	2.96	8.35	4.35	2 85	7.72	1.69	3.24	2.50	32.51	
1856	.50	.30	.20	5.00	3.49	3.89	3 34	1.82	4.54	1.69	2.47	4.32	29.66	
1857	1.45	2.79	1.13	1.83	2.97	4 75	2.75	3.17	5.11	1.60	2.76	.17	30.48	
1858	1.44	.50	1.28	3.92	5.21	7.12	5 90	1.77	6.21	5.07	4.42	2.27	45.11	
1859	1.30	1 29	.17	3 96	3.36	6.46	3.29	1.48	3.31	1.03	3.02	.47	29.16	323.37
1860	.10	1.35	.31	.73	3.13	4.49	1.93	3.35	5.94	3.53	1.57	1.67	28.11	
1861	2.47	3.07	1.16	3.83	5.72	1.21	2.08	1.99	5.49	2.78	2.39	1.26	33.46	
1862	2.40	1.00	3.06	3.78	3.91	2.23	3.93	3.17	4 22	5.02	1.31	1 61	35.64	
1863	1.52	1.61	1.12	.58	2.79	1.85	2.87	3 94	1.13	1.36	2.58	2.35	23.50	
1864	1.10	.08	1.80	1 86	2.77	1 37	5 40	2.64	3.31	1.37	1.09	1.13	23.92	
1865	.10	4.07	2.78	3.49	1.10	7.14	3.55	5.12	2.91	3.59	.36	1.05	35.16	
1866	1.70	95	.75	3.24	1.21	5.54	5.94	7.15	2 69	2.20	1.75	1.44	34.58	
1867	2.20	1.60	1.40	4.13	5.68	7.13	4.51	1.14	1.39	1.50	.92	.97	32.57	
1868	.75	.70	2.26	1.17	2.84	4.46	3.05	1.70	4.98	.79	1.45	.80	24.95	
1869	1.95	2.92	.78	2.41	3.04	4.76	3.94	5.43	2.50	.68	.75	2.60	31.57	303.73
1870	1.21	.94	3.04	.28	1.73	.53	5.12	3.53	1.07	1.11	.29	1.42	20.27	
1871	1.11	1.29	2.25	1.78	4.15	4.42	1.01	3.97	.05	2.76	2.59	2.35	27.54	
1872	.22	.22	1.60	1.73	2.92	2 48	4.83	6.35	2.18	.47	.79	.69	25 39	
1873	3.85	.75	1.84	2 31	6.38	3.74	1.47	2.31	1.89	2.29	.99	1.39	29.21	
1874	1.07	1 10	1.30	1.61	1.33	4.09	2 20	2.67	3 64	1.29	2.61	3.22	26.12	
1875	1.61	1.58	.70	2.72	3.08	4.32	5.34	2.37	2.95	1.31	.63	2.95	29.56	
1876	2.46	1.39	2 46	3.34	2.95	7.43	4.07	7.73	5 69	.18	1.86	.44	40 00	
1877	2.23	0.00	2.64	1.64	2.52	5.61	3.91	1.75	2.43	4.04	2.37	1.99	31.13	
1878	.55	.73	2.67	2.71	5.42	6.54	9.73	1 62	4.83	3.90	.38	.93	40.01	
1879	.47	.97	1.48	2.20	5.14	2.84	4.34	2.10	3.05	2.79	5.23	2.14	33 26	302.49
1880	1.48	83	2 30	2.85	4.84	7.11	6.95	4.08	3.65	1.99	2.20	1.02	39 35	
1881	1.07	2 21	1.74	.54	3.04	5.62	10.76	1.61	9.76	9.63	2.25	.71	48.73	
1882	1.19	.76	2.94	3.21	3.73	6.99	3 62	2.47	2 27	4 98	2.40	1.96	36.53	
1883	1.30	3.17	.33	1.24	7.04	7.16	10.74	2.97	2.80	1.68	2.20	1.44	42.07	
1884	.61	1 81	2.17	2.10	3.33	3.33	4.26	4 79	4.69	3.06	.80	3.15	34.10	
1885	1.62	.53	.35	2.76	1.71	3.23	8.68	5.18	4.70	1.19	.69	2.33	32.97	
1886	1.19	.89	1.83	2.53	2.45	1.63	1.66	1.72	3.08	4 41	1.01	.90	26 30	
1887	1.05	2.66	1.30	1.15	1.07	1.41	3.33	5.01	8.95	2.75	1.14	3.56	33.39	
1888	1.83	.92	4.50	3 02	4.84	3.42	2.56	2.19	.59	1.25	1.60	2.83	29.55	
1889	1.58	.52	1.16	3 07	3.09	4.12	1.94	2.24	3.52	.17	1.57	1.94	23.92	346.76
1890	2.31	.92	1.00	3.33	5.82	9.26	.82	4.66	3 31	6.29	1.58	.48	39.81	
1891	1.46	1.13	2.51	2.37	1.97	3.86	3.83	3 37	1.37	2.53	1.12	2 87	28.39	
1892	1.72	1.30	1.67	3.53	8.91	15.30	2 81	4.04	2.20	1.18	1.08	1.52	45 26	
1893	1.24	1.67	2.61	4.10	4 24	2.79	6.45	1.95	1.79	2.82	1.48	1.62	32.78	
1894	.67	78	2.57	3 54	1.75	3.11	.08	1.41	3 43	2.75	1.61	1.05	22.75	
1895	1.26	.61	.78	1.05	2.44	2.55	1.87	2.31	3.10	.70	1.96	2.14	20.77	189.65
Averages	1 38	1 23	1.66	2.47	3 77	4.72	4.38	3.20	3 39	2.38	1.82	1 67	31.87	

RAINFALL RECORD AT ONAWA, IOWA.

BY C. G. PERKINS, OBSERVER.

YEARS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1879	.40	1.01	1.57	1.16	4.43	4.07	1.17	3.28	.90	2.85	1.00	1.55	23.39
1880	1.03	.60	.75	1.37	3.73	3.47	2.12	3.15	2.54	3.36	.65	.65	23.42
1881	1.50	4.70	1.75	5.02	8.78	3.49	4.17	1.50	5.75	4.56	1.02	.89	43.13
1882	1.80	1.70	.45	4.95	2.82	8.60	6.10	.35	.15	2.42	1.10	.90	31.34
1883	1.50	1.42	.70	2.00	7.74	8.23	4.32	2.55	1.80	2.25	.05	1.12	33.68
1884	.25	1.28	2.45	3.90	3.99	2.49	7.10	6.20	5.43	3.22	.00	1.25	37.56
1885	1.30	.75	.50	3.95	8.63	6.10	8.00	5.55	2.90	3.20	1.28	1.05	43.21
1886	4.85	.40	3.60	2.30	2.20	3.43	2.03	3.90	3.80	.43	5.18	.80	33.01
1887	.86	.63	.40	1.44	2.40	2.43	3.59	7.53	3.37	.50	.50	2.65	27.30
1888	1.48	.33	4.65	4.33	9.82	2.63	3.95	4.65	.48	.73	.08	1.10	37.18
1889	1.50	.20	.30	1.85	2.09	7.66	7.60	.72	2.07	.10	2.40	1.05	27.42
1890	1.55	.77	2.25	1.65	4.70	11.70	3.04	5.05	1.73	2.90	2.00	.03	37.37
1891	1.62	1.07	1.66	1.78	3.43	5.76	7.41	5.31	1.20	5.25	.48	1.72	36.69
1892	.28	.51	1.63	4.10	6.85	1.65	2.69	4.58	.53	1.90	.25	.85	25.78
1893	1.46	2.65	1.60	2.33	4.46	1.73	5.83	3.83	.95	.40	.85	1.18	27.27
1894	.75	.50	.35	1.84	.81	4.12	2.20	1.90	.72	1.72	.05	1.05	16.01
1895	.26	.60	1.01	3.54	1.41	9.34	.67	8.68	5.29	.06	1.01	.10	31.97
Averages	1.32	1.12	1.51	2.79	4.61	5.17	4.24	3.93	2.33	2.29	1.05	1.06	31.42

PRECIPITATION DATA.

Average Monthly and Annual Precipitation (rain and melted snow) at various Iowa stations for the period of years named in the last column.

STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	No. of years.
Albion	.91	1.89	2.17	2.04	4.18	5.11	4.54	3.02	4.40	3.07	1.84	1.18	34.35	[illegible]
Algona	.92	1.57	1.52	2.20	3.46	4.62	3.04	3.82	3.23	2.21	1.30	.99	[illegible]	14
Amana	1.42	1.30	1.90	2.72	4.24	4.67	4.18	3.56	3.34	2.84	1.82	1.48	33.61	21
Ames	1.06	.76	1.49	2.77	4.09	4.47	4.72	3.50	3.54	2.24	1.27	1.00	30.44	12
Brookside	1.43	1.67	2.43	2.99	4.82	5.78	5.97	5.29	4.60	3.62	2.24	1.36	40.97	10
Brookville	1.26	1.26	1.99	3.06	3.83	4.97	2.82	3.39	3.00	2.95	1.77	1.62	32.24	11
Cedar Rapids	1.62	1.60	2.37	3.02	4.71	3.84	3.85	2.98	2.87	2.76	1.61	1.75	32.57	13
Cresco	1.38	1.00	1.77	2.16	3.47	5.14	4.32	3.13	3.94	2.38	1.50	1.42	31.45	19
Council Bluffs	.80	1.18	1.57	2.53	4.59	5.95	5.23	3.34	3.45	3.04	1.10	.99	33.36	13
Clinton	1.92	2.32	3.27	3.12	4.47	4.63	4.12	3.63	3.23	2.86	1.96	2.11	37.45	17
Davenport	1.64	1.56	2.11	2.80	4.31	4.30	3.73	3.57	3.21	2.58	2.01	1.31	33.39	23
Denmark	1.46	1.98	2.32	2.53	4.47	5.85	3.33	3.52	2.80	3.82	1.87	1.94	35.56	12
Des Moines	1.40	1.31	1.45	2.56	4.62	5.85	3.19	3.51	3.40	3.53	1.90	1.40	35.06	13
Dubuque	1.64	1.48	2.21	3.00	4.15	5.11	4.43	3.11	4.19	2.70	2.08	1.80	31.56	23
Dysart	1.24	1.24	1.73	2.11	3.89	4.97	4.75	3.80	4.75	3.13	1.79	1.68	34.30	11
Elkader	1.58	1.10	1.74	2.91	3.82	3.94	4.25	2.97	3.90	2.72	1.75	2.32	33.00	15
Fairfield	1.46	1.44	2.01	2.93	6.50	4.17	3.20	3.96	2.85	2.82	2.07	1.80	35.21	9
Ft. Madison	1.90	2.08	2.77	3.13	4.30	4.47	3.80	3.88	3.69	2.98	2.20	1.98	37.35	[illegible]
Garnavillo	1.03	1.11	1.28	2.00	3.25	3.72	5.27	3.20	4.55	3.21	1.08	1.06	30.85	[illegible]
Glenwood	.84	.79	1.30	1.49	5.36	4.69	3.76	3.66	2.20	2.43	1.00	.77	30.20	[illegible]
Guttenburg	1.14	1.17	1.88	2.33	3.56	5.17	4.62	3.62	3.87	2.34	2.01	1.89	34.16	10
Ida Grove	.82	1.00	.84	1.64	3.85	5.14	3.71	3.14	3.84	2.70	1.00	.94	28.62	[illegible]
Independence	1.37	1.05	1.79	2.21	4.17	5.03	4.72	3.43	4.70	2.37	1.52	1.48	[illegible]	[illegible]
Iowa City	1.74	1.55	2.58	3.13	4.21	5.03	4.35	4.67	4.24	3.11	2.64	1.74	[illegible]	[illegible]
Keokuk	1.73	1.80	2.16	2.96	4.01	4.92	4.19	3.12	3.53	3.15	2.03	1.96	[illegible]	[illegible]
LeClaire	1.58	1.99	2.21	2.74	4.94	5.22	4.09	3.25	3.26	3.49	1.71	1.75	[illegible]	[illegible]

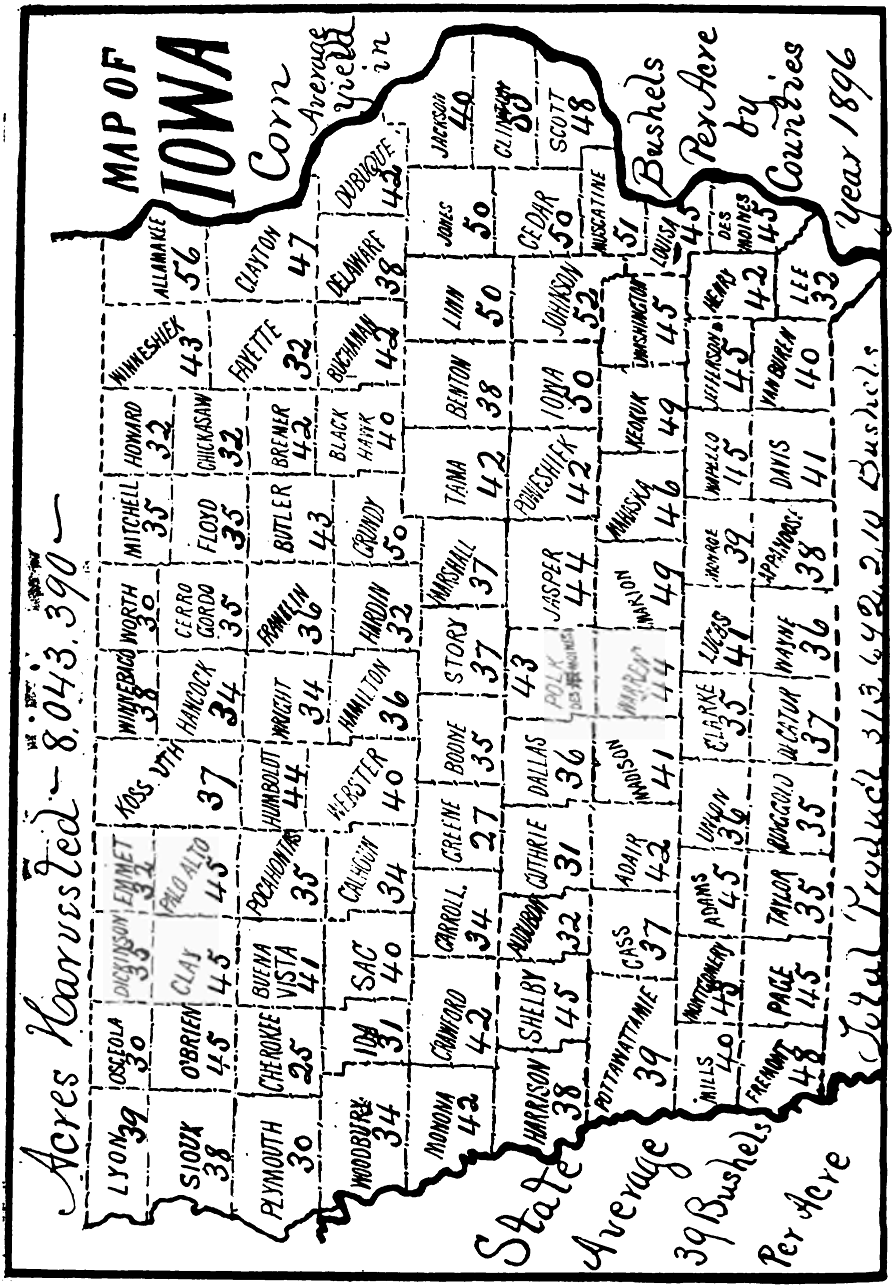
PRECIPITATION DATA—CONTINUED.

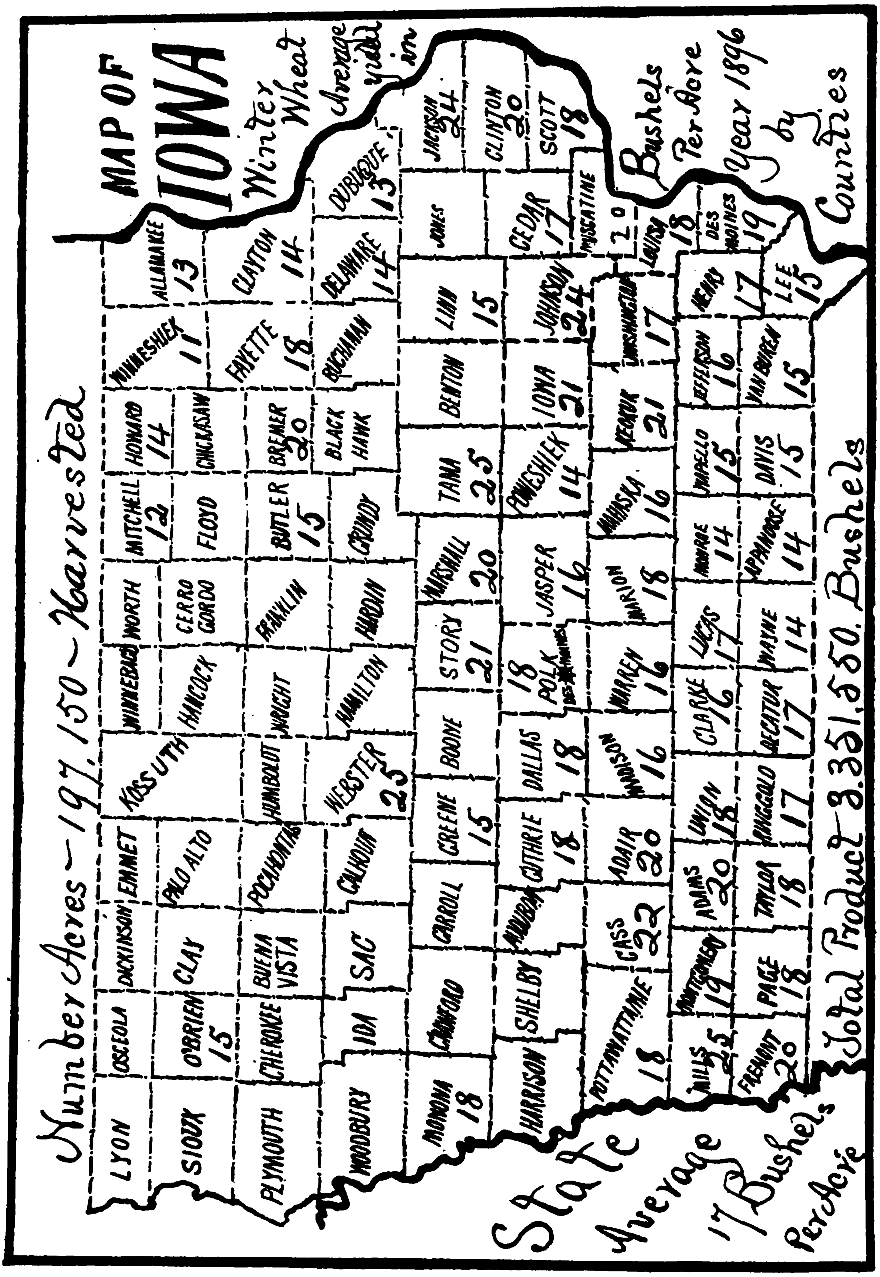
STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	No. of years.
Logan	1.30	1.36	2.06	2.63	4.46	5.84	5.41	3.82	3.33	2.61	1.31	1.35	35.51	16
McGregor	1.59	1.21	1.90	2.38	3.68	4.96	5.08	3.37	4.04	3.18	1.78	1.79	34.97	16
Monticello	1.57	1.75	2.37	2.62	3.91	4.47	4.20	3.69	3.82	2.77	2.30	2.25	35.79	43
Muscatine	1.81	2.08	2.79	3.41	4.38	4.86	3.91	4.38	3.72	3.04	2.30	2.28	39.22	43
Nashua	1.54	2.23	2.76	2.07	4.19	5.35	6.68	3.87	5.81	3.45	2.34	3.94	45.16	10
Newton	.65	.98	1.27	3.37	4.72	4.13	3.50	3.70	3.39	2.60	2.00	1.26	31.57	9
Osage	.88	1.04	1.28	2.86	4.40	4.21	3.56	2.81	3.58	2.62	1.50	1.40	30.14	9
Omaha	.67	.73	1.46	3.11	4.51	5.64	5.15	3.42	3.36	2.77	1.23	1.01	33.06	19
Oskaloosa	.94	1.13	2.16	2.74	3.62	4.42	3.58	2.93	3.27	2.34	1.89	1.28	31.21	11
Sac City	1.29	1.13	1.56	2.91	4.36	5.38	4.11	3.37	3.46	2.28	1.27	1.28	30.83	19
Smithland	.54	.65	.65	2.09	3.50	4.32	2.96	2.77	2.84	1.76	1.71	.63	24.43	9
Waterloo	1.18	1.24	1.49	2.00	3.38	3.66	4.05	3.71	4.51	2.27	1.40	1.40	30.76	12
Waukon	1.50	1.39	2.21	2.34	3.57	4.83	4.90	3.43	4.41	2.27	1.77	1.74	35.20	13
Wesley	1.14	1.03	1.42	2.30	3.30	4.74	3.50	2.79	3.52	2.17	1.13	2.16	29.60	10
Means	1.05	1.35	1.88	2.60	4.18	4.59	4.22	3.25	3.44	2.78	1.72	1.31	33.50	...

TEMPERATURE DATA.

Mean Monthly and Annual Temperature at various Iowa stations, for the number of years named in the last column.

STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	No. of years.
Albion	11.6	17.3	28.7	45.3	58.4	66.9	70.9	69.9	59.5	49.1	29.7	17.1	43.8	6
Algona	10.7	17.3	25.5	43.6	59.3	67.7	73.3	70.2	59.9	46.8	31.1	17.8	43.6	11
Amana	13.8	20.5	30.7	48.4	59.6	69.5	73.6	70.3	61.4	50.7	31.8	22.1	45.9	19
Ames	15.3	22.2	32.0	49.2	58.9	69.9	75.0	72.2	63.0	49.7	31.3	23.7	47.2	10
Brookside	12.7	19.9	29.1	45.1	59.0	68.6	73.4	69.9	61.0	46.6	31.4	17.5	44.2	9
Cedar Rapids	16.3	21.5	32.4	43.3	59.0	70.6	74.5	71.6	62.6	49.4	34.5	25.6	47.5	14
Cresco	9.8	15.4	26.0	43.9	56.4	66.1	70.8	68.5	58.9	45.8	29.2	18.4	42.5	19
Clinton	19.1	22.7	32.2	47.8	59.5	69.2	73.4	70.6	62.5	49.3	35.2	25.0	47.0	20
Davenport	20.7	25.4	34.8	50.1	61.0	70.8	75.0	72.7	64.5	52.1	36.8	28.0	49.3	25
Des Moines	17.9	23.6	34.2	50.6	60.6	69.9	74.4	72.1	63.6	52.0	36.9	26.5	48.3	18
Dubuque	18.3	22.8	32.9	49.0	60.4	69.5	74.4	71.7	63.2	50.9	35.1	26.1	48.0	23
Elkader	12.5	18.0	30.6	48.3	60.8	69.5	73.7	70.3	61.6	47.8	31.2	22.2	45.5	14
Fairfield	13.9	21.8	32.8	49.4	59.0	70.0	74.8	70.1	62.9	50.7	35.0	25.6	47.2	9
Ft. Madison	22.4	27.5	37.1	51.2	63.0	73.1	77.6	74.5	65.7	52.7	38.2	26.9	50.8	39
Garnavillo	9.0	15.3	26.4	43.4	56.8	65.4	69.1	66.6	58.2	46.1	28.9	16.6	41.8	7
Glenwood	17.4	23.4	33.0	48.8	59.9	70.4	73.5	72.0	61.7	48.9	33.7	25.1	46.5	20
Guttenburg	13.9	20.0	28.7	44.6	57.8	66.7	70.6	67.9	59.5	47.1	31.9	19.3	44.0	17
Ida Grove	19.1	25.0	39.6	57.5	70.2	78.4	81.0	82.3	71.8	62.0	41.6	26.2	54.6	7
Independence	14.7	21.8	29.9	47.2	59.7	69.1	73.4	70.2	61.3	48.2	33.2	21.7	45.7	24
Iowa City	18.9	23.9	33.3	48.1	60.1	68.8	74.1	71.3	63.0	50.3	35.3	27.6	47.6	31
Keokuk	23.6	29.1	37.2	51.9	62.8	72.1	77.1	74.4	66.1	54.1	40.0	29.8	49.0	20
Logan	18.0	24.8	34.3	49.2	61.0	69.5	74.8	72.5	62.7	51.8	35.6	24.5	48.3	23
Monticello	15.2	21.3	31.8	48.3	59.5	68.7	72.9	70.0	61.5	48.7	33.2	22.8	45.9	42
Mt. Vernon	17.1	21.8	31.5	48.7	60.5	70.4	74.1	71.2	62.0	49.1	33.8	23.1	46.4	12
Nashua	8.5	15.4	28.0	41.8	54.9	64.7	70.6	66.3	57.1	48.2	30.6	18.1	41.8	7
Newton	15.4	21.2	34.0	48.4	60.7	70.3	74.7	71.8	61.6	49.6	32.6	22.7	46.6	9
Osage	11.6	16.6	26.5	45.3	56.1	66.4	69.4	66.4	58.6	43.6	26.3	21.1	42.2	6
Omaha	18.8	25.6	35.4	50.5	62.3	71.4	76.3	74.0	63.9	52.7	36.4	25.4	49.4	18
Oskaloosa	16.1	21.5	33.6	49.4	59.3	69.6	75.0	70.9	63.6	50.5	35.9	26.5	47.9	9
Smithland	14.4	17.0	28.5	44.5	63.1	67.9	70.7	70.9	56.8	49.5	26.9	16.4	43.9	4
Washington	16.8	23.7	32.2	50.9	61.1	72.5	77.9	73.6	63.8	51.0	35.4	25.1	49.0	10
Wesley	15.1	22.2	34.4	54.7	60.3	74.7	77.6	75.7	66.4	54.2	35.8	22.8	49.5	8
Means	15.6	21.4	31.7	48.1	60.0	69.6	74.0	71.3	62.2	50.0	33.6	23.0	46.6	...


MAP OF IOWA
Corn Average yield in Bushels Per Acre by Counties Year 1896
Acres Harvested — 8,043,390 —
Total Product 313,642,210 Bushels
State Average 39 Bushels Per Acre
LYON 39
OSCEOLA 30
DICKINSON 33
EMMET 32
KOSSUTH 37
WINNEBAGO 38
WORTH 30
MITCHELL 35
HOWARD 32
WINNESHIEK 43
ALLAMAKEE 56
SIOUX 38
O'BRIEN 45
CLAY 45
PALO ALTO 45
HANCOCK 34
CERRO GORDO 35
FLOYD 35
CHICKASAW 32
FAYETTE 32
CLAYTON 47
PLYMOUTH 30
CHEROKEE 25
BUENA VISTA 41
POCAHONTAS 35
HUMBOLDT 44
WRIGHT 34
FRANKLIN 36
BUTLER 43
BREMER 42
BLACK HAWK 40
BUCHANAN 42
DELAWARE 38
DUBUQUE 42
WOODBURY 34
IDA 31
SAC 40
CALHOUN 34
WEBSTER 40
HAMILTON 36
HARDIN 32
GRUNDY 50
TAMA 42
BENTON 38
LINN 50
JONES 50
JACKSON 40
CLINTON 50
SCOTT 48
CEDAR 50
MUSCATINE 51
JOHNSON 52
IOWA 50
POWESHIEK 42
MARSHALL 37
STORY 37
BOONE 35
GREENE 27
CARROLL 34
CRAWFORD 42
MONONA 42
HARRISON 38
SHELBY 45
AUDUBON 32
GUTHRIE 31
DALLAS 36
POLK DES MOINES 43
JASPER 44
MARION 49
MAHASKA 46
KEOKUK 49
WASHINGTON 45
LOUISA 45
DES MOINES 45
HENRY 42
LEE 32
JEFFERSON 45
VAN BUREN 40
WAPELLO 45
DAVIS 41
MONROE 39
APPANOOSE 38
LUCAS 41
WAYNE 36
CLARKE 35
DECATUR 37
WARREN 44
MADISON 41
UNION 36
RINGGOLD 35
ADAIR 42
ADAMS 45
TAYLOR 35
CASS 37
MONTGOMERY 43
PAGE 45
POTTAWATTAMIE 39
MILLS 40
FREMONT 48


MAP OF IOWA
Winter Wheat
Average yield in Bushels Per Acre year 1896 by Counties
Number Acres—197,150—Harvested
Total Product 3,351,550. Bushels
State Average 17 Bushels Per Acre
ALLAMAKEE 13
CLAYTON 14
DUBUQUE 13
JACKSON 24
CLINTON 20
SCOTT 18
WINNESHIEK 11
FAYETTE 18
DELAWARE 14
JONES
CEDAR 17
MUSCATINE 20
HOWARD 14
CHICKASAW
BREMER 20
BUCHANAN
LINN 15
JOHNSON 24
LOUISA 18
DES MOINES 19
MITCHELL 12
FLOYD
BUTLER 15
BLACK HAWK
BENTON
IOWA 21
WASHINGTON 17
HENRY 17
LEE 15
WORTH
CERRO GORDO
FRANKLIN
GRUNDY
TAMA 25
POWESHIEK 14
KEOKUK 21
JEFFERSON 16
VAN BUREN 15
WINNEBAGO
HANCOCK
WRIGHT
HARDIN
MARSHALL 20
JASPER 16
MAHASKA 16
WAPELLO 15
DAVIS 15
KOSSUTH
HUMBOLDT
HAMILTON
STORY 21
MARION 18
MONROE 14
APPANOOSE 14
EMMET
PALO ALTO
POCAHONTAS
WEBSTER 25
BOONE
POLK 18
DES MOINES
WARREN 16
LUCAS 17
WAYNE 14
DICKINSON
CLAY
CALHOUN
GREENE 15
DALLAS 18
MADISON 16
CLARKE 16
DECATUR 17
OSCEOLA
O'BRIEN 15
BUENA VISTA
SAC
CARROLL
GUTHRIE 18
ADAIR 20
UNION 18
RINGGOLD 17
LYON
SIOUX
CHEROKEE
IDA
CRAWFORD
AUDUBON
CASS 22
ADAMS 20
TAYLOR 18
PLYMOUTH
WOODBURY
MONONA 18
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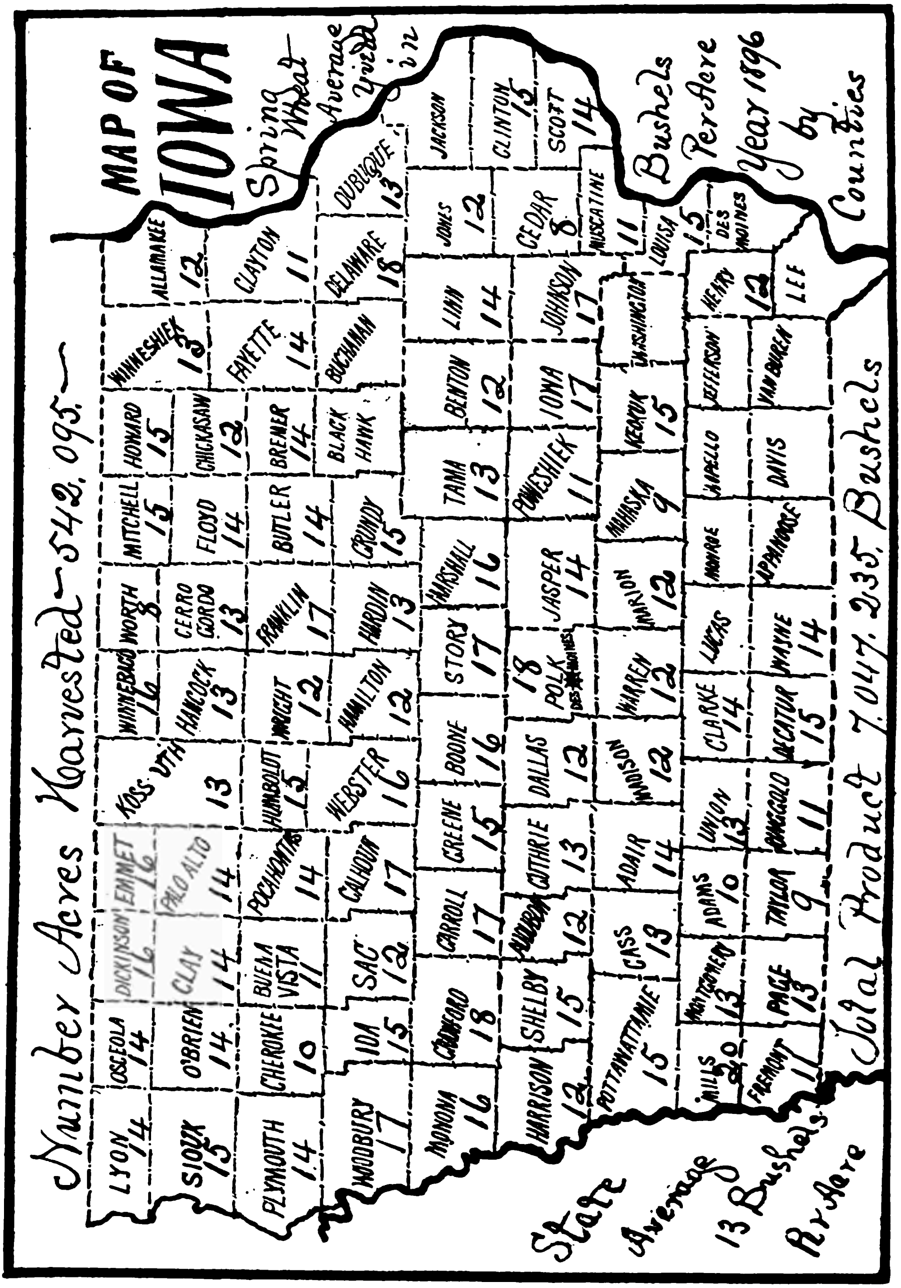
MAP OF IOWA
Spring Wheat Average Yield in Bushels Per Acre Year 1896 by Counties
Number Acres Harvested—542,095—
Total Product 7,047,235 Bushels
State Average 13 Bushels Per Acre
LYON 14
OSCEOLA 14
DICKINSON 16
EMMET 16
KOSSUTH 13
WINNEBAGO 16
WORTH 8
MITCHELL 15
HOWARD 15
WINNESHIEK 13
ALLAMAKEE 12
SIOUX 15
O'BRIEN 14
CLAY 14
PALO ALTO 14
HANCOCK 13
CERRO GORDO 13
FLOYD 14
CHICKASAW 12
FAYETTE 14
CLAYTON 11
PLYMOUTH 14
CHEROKEE 10
BUENA VISTA 11
POCAHONTAS 14
HUMBOLDT 15
WRIGHT 12
FRANKLIN 17
BUTLER 14
BREMER 14
BUCHANAN
DELAWARE 18
DUBUQUE 13
WOODBURY 17
IDA 15
SAC 12
CALHOUN 17
WEBSTER 16
HAMILTON 12
HARDIN 13
GRUNDY 15
BLACK HAWK
MONONA 16
CRAWFORD 18
CARROLL 17
GREENE 15
BOONE 16
STORY 17
MARSHALL 16
TAMA 13
BENTON 12
LINN 14
JONES 12
JACKSON
CLINTON 15
HARRISON 12
SHELBY 15
AUDUBON 12
GUTHRIE 13
DALLAS 12
POLK 18
DES MOINES
JASPER 14
POWESHIEK 11
IOWA 17
JOHNSON 17
CEDAR 8
SCOTT 14
MUSCATINE 11
POTTAWATTAMIE 15
CASS 13
ADAIR 14
MADISON 12
WARREN 12
MARION 12
MAHASKA 9
KEOKUK 15
WASHINGTON
LOUISA 15
MILLS 20
MONTGOMERY 13
ADAMS 10
UNION 13
CLARKE 14
LUCAS
MONROE
WAPELLO
JEFFERSON
HENRY 12
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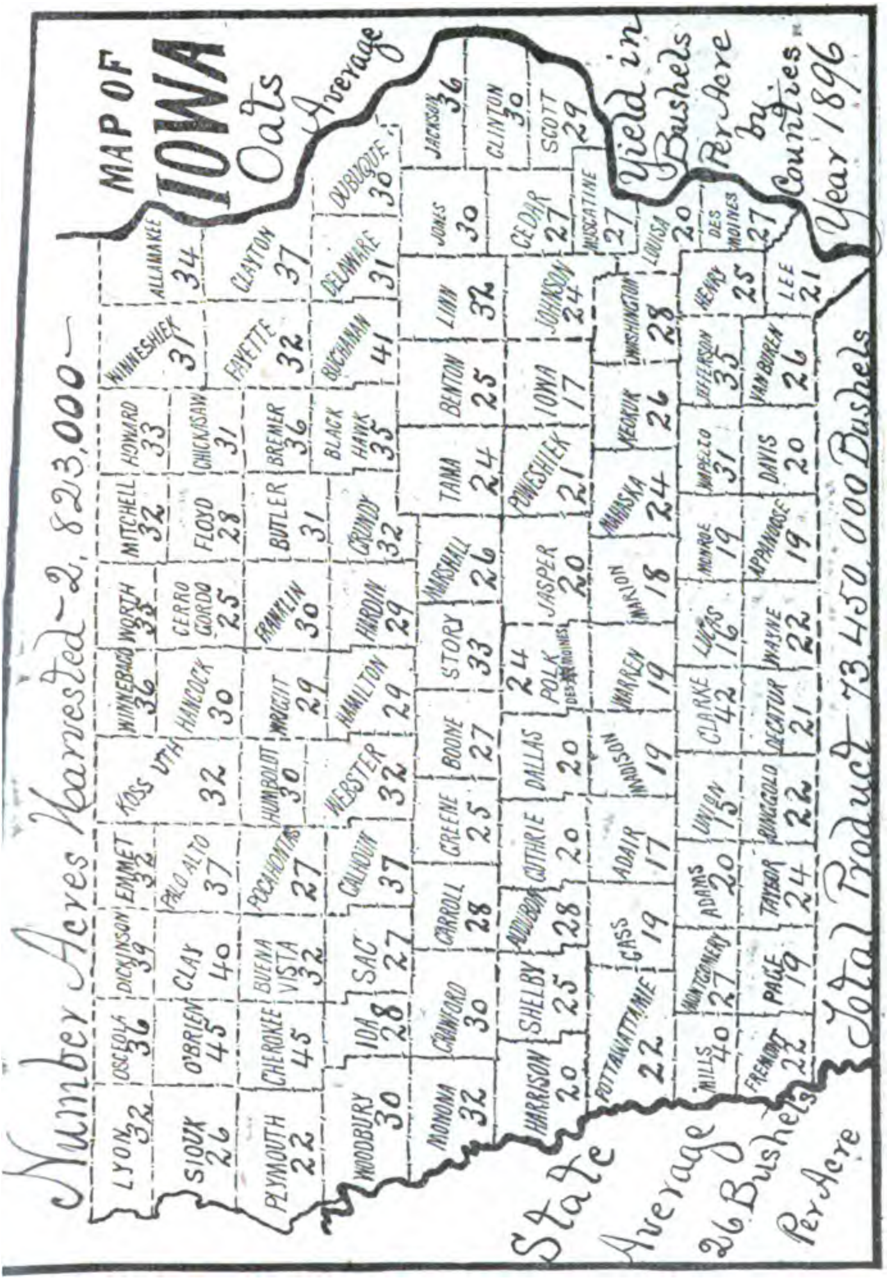
APPANOOSE
DAVIS
VAN BUREN


MAP OF
IOWA
Oats
Average
Yield in Bushels
Per Acre
by Counties
Year 1896
Number Acres Harvested—2,823,000—
Total Product 73,450,000 Bushels
State Average 26 Bushels Per Acre
LYON 32
OSCEOLA 36
DICKINSON 39
EMMET 32
KOSS UTH 32
WINNEBAGO 36
WORTH 33
MITCHELL 32
HOWARD 33
WINNESHIEK 31
ALLAMAKEE 34
SIOUX 26
O'BRIEN 45
CLAY 40
PALO ALTO 37
HANCOCK 30
CERRO GORDO 25
FLOYD 28
CHICKASAW 31
FAYETTE 32
CLAYTON 37
PLYMOUTH 22
CHEROKEE 45
BUENA VISTA 32
POCAHONTAS 27
HUMBOLDT 30
WRIGHT 29
FRANKLIN 30
BUTLER 31
BREMER 36
BLACK HAWK 35
BUCHANAN 41
DELAWARE 31
DUBUQUE 30
WOODBURY 30
IDA 28
SAC 27
CALHOUN 37
WEBSTER 32
HAMILTON 29
HARDIN 29
GRUNDY 32
TAMA 24
BENTON 25
LINN 32
JONES 30
JACKSON 36
CLINTON 30
SCOTT 29
CEDAR 27
MUSCATINE 27
JOHNSON 24
IOWA 17
POWESHIEK 21
MARSHALL 26
STORY 33
BOONE 27
GREENE 25
CARROLL 28
CRAWFORD 30
MONONA 32
HARRISON 20
SHELBY 25
AUDUBON 28
GUTHRIE 20
DALLAS 20
POLK 24
DES MOINES
JASPER 20
MAHASKA 24
KEOKUK 26
WASHINGTON 28
LOUISA 20
DES MOINES 27
HENRY 25
LEE 21
JEFFERSON 35
VAN BUREN 26
WAPELLO 31
DAVIS 20
MONROE 19
APPANOOSE 19
MARION 18
LUCAS 16
WAYNE 22
WARREN 19
CLARKE 42
DECATUR 21
MADISON 19
UNION 15
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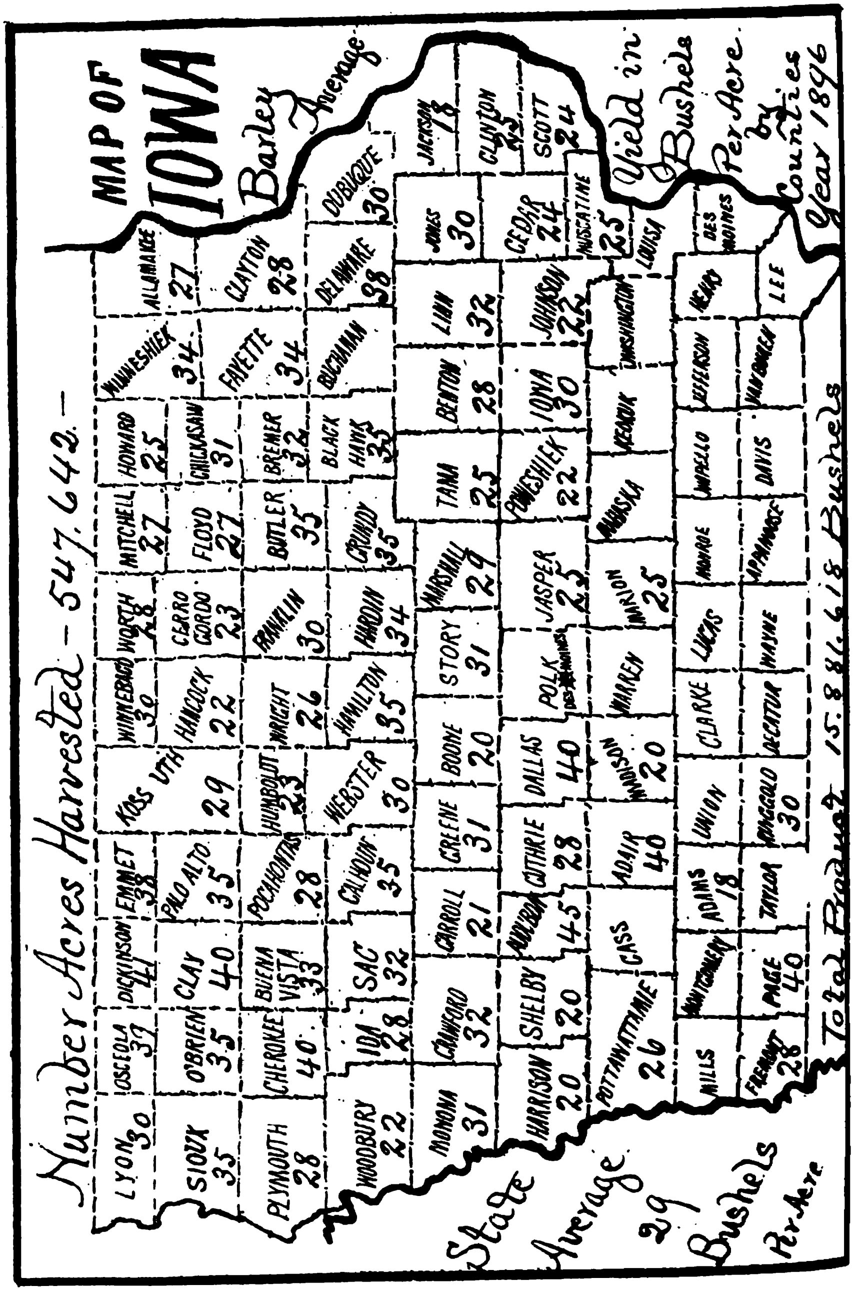
MAP OF IOWA
Barley Average
Yield in Bushels Per Acre by Counties Year 1896
Number Acres Harvested - 547,642.-
Total Product 15,884,618 Bushels
State Average 29 Bushels Per Acre
LYON 30
OSCEOLA 37
DICKINSON 41
EMMET 38
KOSSUTH 29
WINNEBAGO 30
WORTH 28
MITCHELL 27
HOWARD 25
WINNESHIEK 34
ALLAMAKEE 27
SIOUX 35
O'BRIEN 35
CLAY 40
PALO ALTO 35
HANCOCK 22
CERRO GORDO 23
FLOYD 27
CHICKASAW 31
FAYETTE 34
CLAYTON 28
PLYMOUTH 28
CHEROKEE 40
BUENA VISTA 33
POCAHONTAS 28
HUMBOLDT 23
WRIGHT 26
FRANKLIN 30
BUTLER 35
BREMER 32
BUCHANAN
DELAWARE 28
DUBUQUE 30
WOODBURY 22
IDA 28
SAC 32
CALHOUN 35
WEBSTER 30
HAMILTON 35
HARDIN 34
GRUNDY 35
BLACK HAWK 35
MONONA 31
CRAWFORD 32
CARROLL 21
GREENE 31
BOONE 20
STORY 31
MARSHALL 29
TAMA 25
BENTON 28
LINN 32
JONES 30
JACKSON 18
CLINTON 25
HARRISON 20
SHELBY 20
AUDUBON 45
GUTHRIE 28
DALLAS 40
POLK
DES MOINES
JASPER 25
POWESHIEK 22
IOWA 30
JOHNSON 22
CEDAR 24
SCOTT 24
MUSCATINE 25
POTTAWATTAMIE 26
CASS
ADAIR 40
MADISON 20
WARREN
MARION 25
MAHASKA
KEOKUK
WASHINGTON
LOUISA
MILLS
MONTGOMERY
ADAMS 18
UNION
CLARKE
LUCAS
MONROE
WAPELLO
JEFFERSON
HENRY
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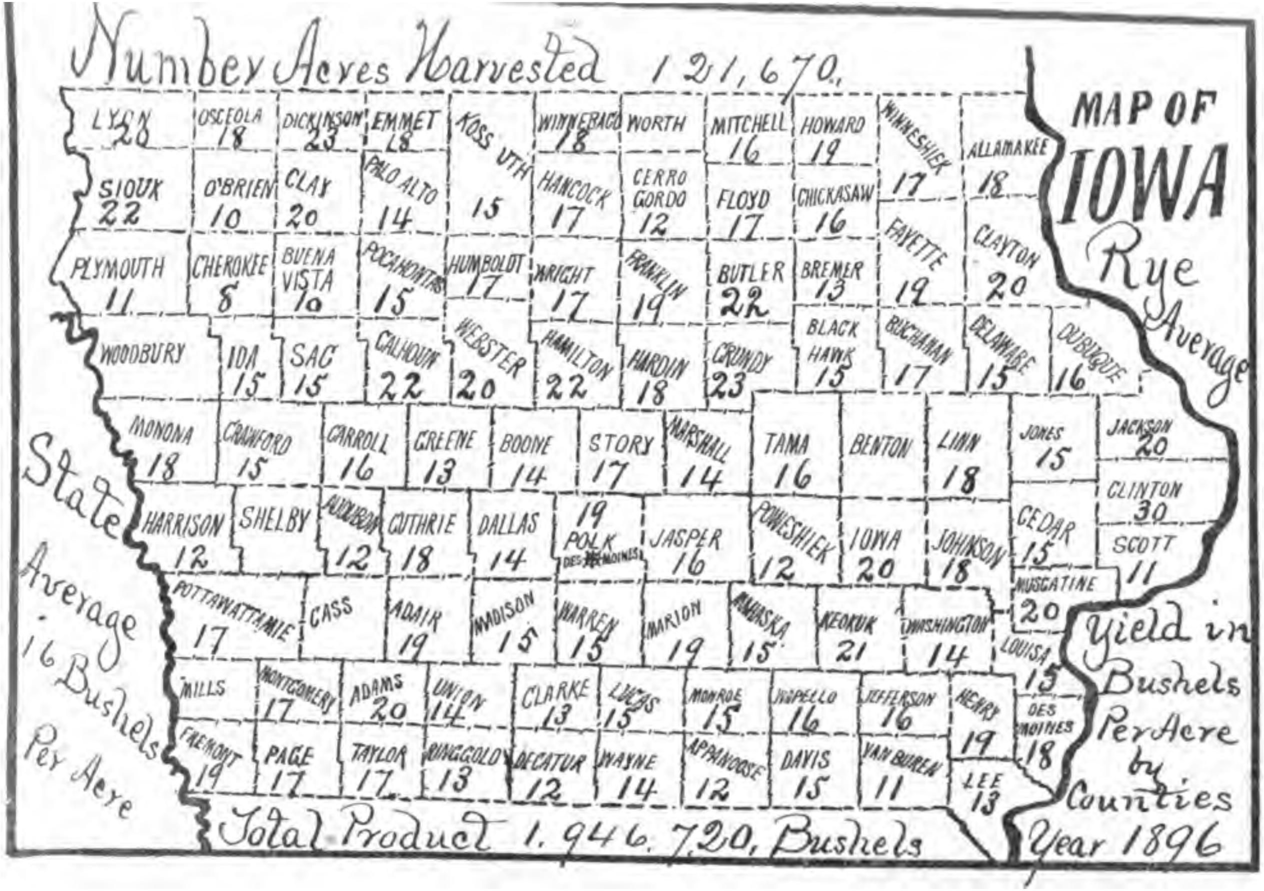
MAP OF
IOWA
Rye
Average
Number Acres Harvested 121,670.
Yield in Bushels Per Acre by Counties Year 1896
Total Product 1,946,720, Bushels
State Average 16 Bushels Per Acre
LYON 20
OSCEOLA 18
DICKINSON 23
EMMET 18
KOSSUTH 15
WINNEBAGO 18
WORTH
MITCHELL 16
HOWARD 19
WINNESHIEK 17
ALLAMAKEE 18
SIOUX 22
O'BRIEN 10
CLAY 20
PALO ALTO 14
HANCOCK 17
CERRO GORDO 12
FLOYD 17
CHICKASAW 16
FAYETTE 19
CLAYTON 20
PLYMOUTH 11
CHEROKEE 8
BUENA VISTA 10
POCAHONTAS 15
HUMBOLDT 17
WRIGHT 17
FRANKLIN 19
BUTLER 22
BREMER 13
WOODBURY
IDA 15
SAC 15
CALHOUN 22
WEBSTER 20
HAMILTON 22
HARDIN 18
GRUNDY 23
BLACK HAWK 15
BUCHANAN 17
DELAWARE 15
DUBUQUE 16
MONONA 18
CRAWFORD 15
CARROLL 16
GREENE 13
BOONE 14
STORY 17
MARSHALL 14
TAMA 16
BENTON
LINN 18
JONES 15
JACKSON 20
CLINTON 30
HARRISON 12
SHELBY
AUDUBON 12
GUTHRIE 18
DALLAS 14
19 POLK DES MOINES
JASPER 16
POWESHIEK 12
IOWA 20
JOHNSON 18
CEDAR 15
SCOTT 11
MUSCATINE 20
POTTAWATTAMIE 17
CASS
ADAIR 19
MADISON 15
WARREN 15
MARION 19
MAHASKA 15
KEOKUK 21
WASHINGTON 14
LOUISA 15
MILLS
MONTGOMERY 17
ADAMS 20
UNION 14
CLARKE 13
LUCAS 15
MONROE 15
WAPELLO 16
JEFFERSON 16
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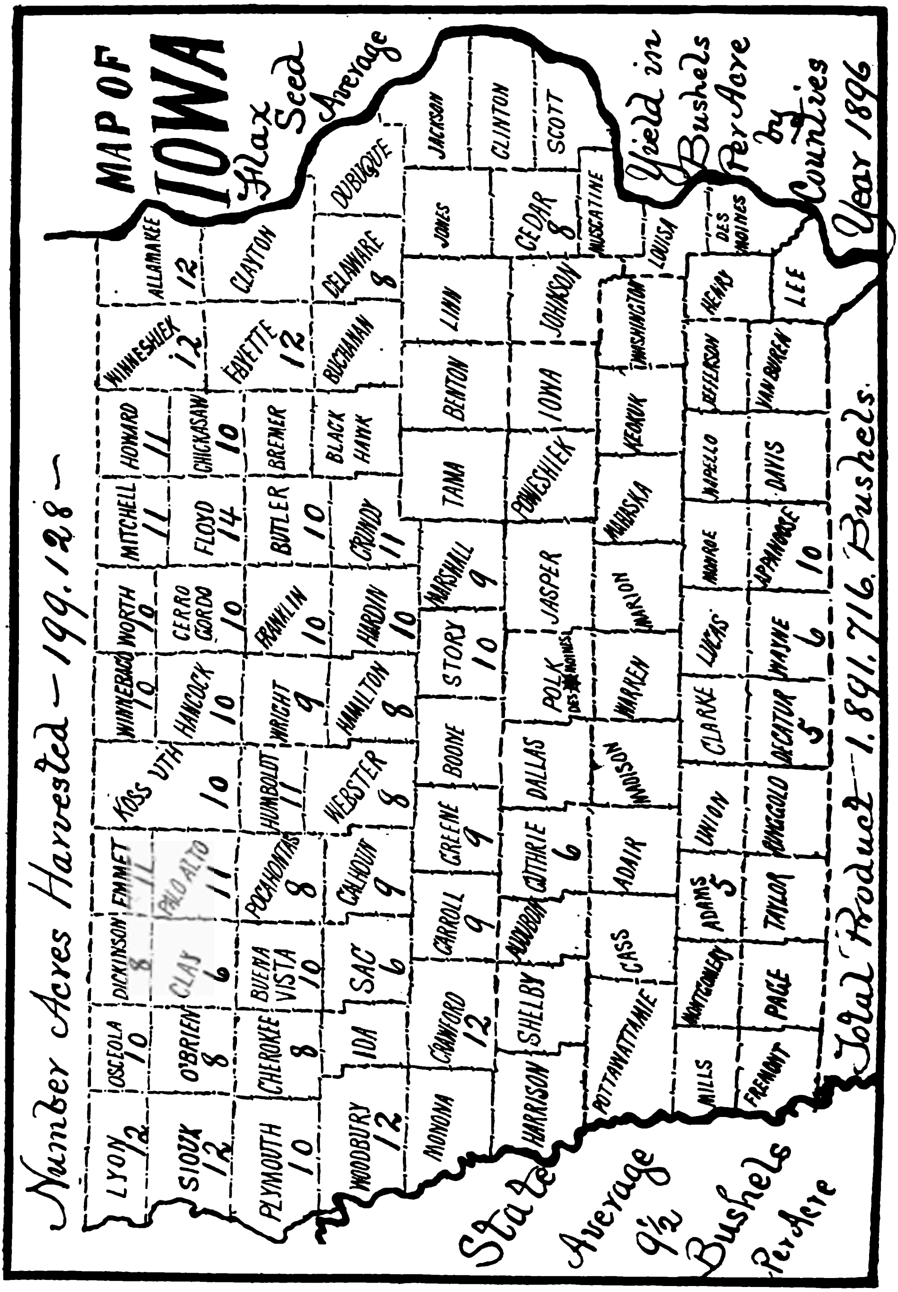
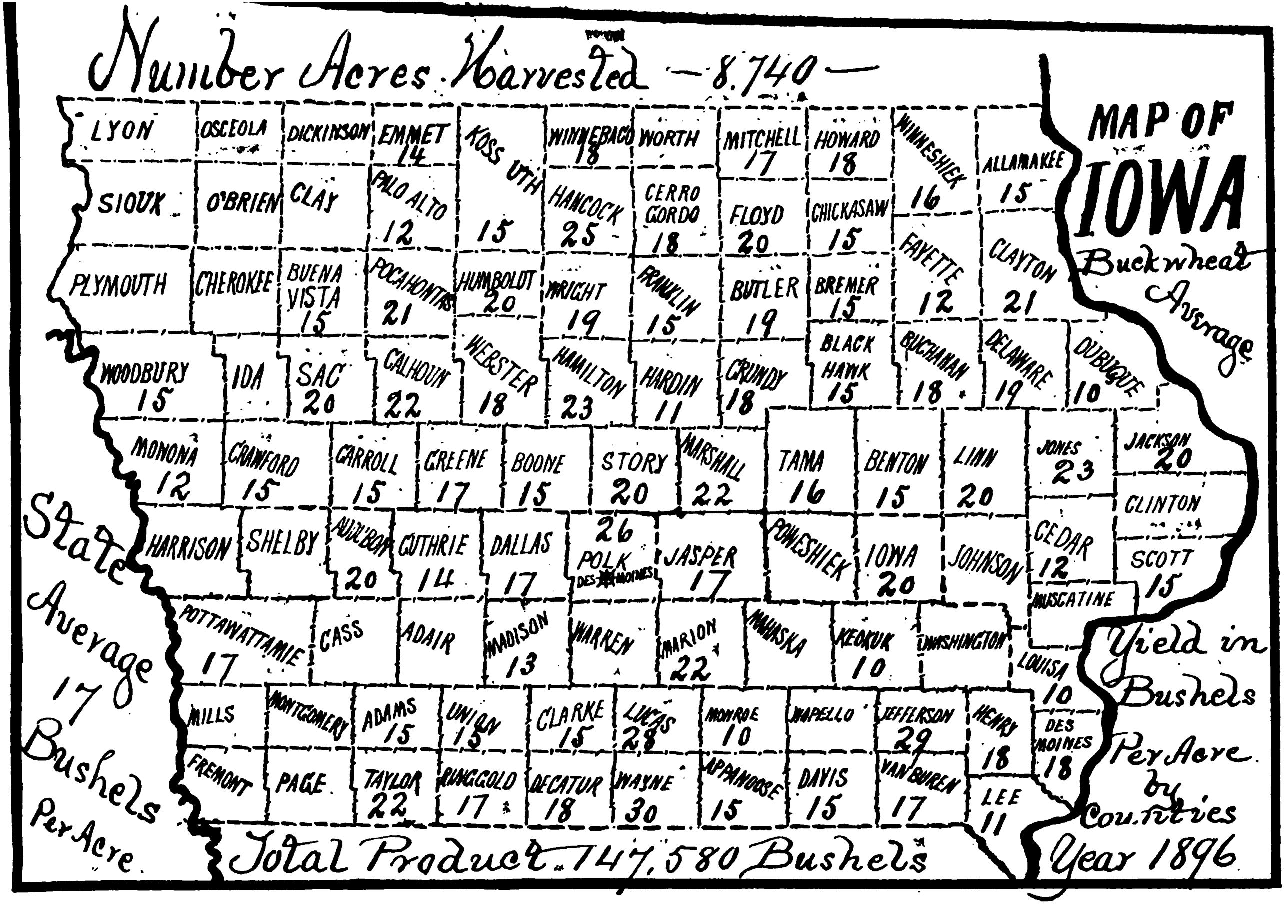
LEE 13


MAP OF IOWA
Flax Seed Average
Yield in Bushels Per Acre by Counties Year 1896
Number Acres Harvested — 199.128 —
Total Product — 1.891.716. Bushels.
State Average 9½ Bushels Per Acre
ALLAMAKEE 12
WINNESHIEK 12
HOWARD 11
MITCHELL 11
WORTH 10
WINNEBAGO 10
KOSSUTH 10
EMMET 11
DICKINSON 8
OSCEOLA 10
LYON 12
CLAYTON
FAYETTE 12
CHICKASAW 10
FLOYD 14
CERRO GORDO 10
HANCOCK 10
PALO ALTO 11
CLAY 6
O'BRIEN 8
SIOUX 12
DUBUQUE
DELAWARE 8
BUCHANAN
BREMER
BUTLER 10
FRANKLIN 10
WRIGHT 9
HUMBOLDT 11
POCAHONTAS 8
BUENA VISTA 10
CHEROKEE 8
PLYMOUTH 10
BLACK HAWK
GRUNDY 11
HARDIN 10
HAMILTON 8
WEBSTER 8
CALHOUN 9
SAC 6
IDA
WOODBURY 12
JACKSON
JONES
LINN
BENTON
TAMA
MARSHALL 9
STORY 10
BOONE
GREENE 9
CARROLL 9
CRAWFORD 12
MONONA
CLINTON
CEDAR 8
JOHNSON
IOWA
POWESHIEK
JASPER
POLK
DES MOINES
DALLAS
GUTHRIE 6
AUDUBON
SHELBY
HARRISON
SCOTT
MUSCATINE
LOUISA
WASHINGTON
KEOKUK
MAHASKA
MARION
WARREN
MADISON
ADAIR
CASS
POTTAWATTAMIE
DES MOINES
HENRY
JEFFERSON
WAPELLO
MONROE
LUCAS
CLARKE
UNION
ADAMS 5
MONTGOMERY
MILLS
LEE
VAN BUREN
DAVIS
APPANOOSE 10
WAYNE 6
DECATUR 5
RINGGOLD
TAYLOR
PAGE
FREMONT


Number Acres Harvested —8.740—
MAP OF IOWA
Buckwheat Average
Yield in Bushels Per Acre by Counties
Year 1896
State Average 17 Bushels Per Acre.
Total Product 147,580 Bushels
LYON
OSCEOLA
DICKINSON
EMMET 14
KOSSUTH 15
WINNEBAGO 18
WORTH
MITCHELL 17
HOWARD 18
WINNESHIEK 16
ALLAMAKEE 15
SIOUX
O'BRIEN
CLAY
PALO ALTO 12
HANCOCK 25
CERRO GORDO 18
FLOYD 20
CHICKASAW 15
FAYETTE 12
CLAYTON 21
PLYMOUTH
CHEROKEE
BUENA VISTA 15
POCAHONTAS 21
HUMBOLDT 20
WRIGHT 19
FRANKLIN 15
BUTLER 19
BREMER 15
BLACK HAWK 15
BUCHANAN 18
DELAWARE 19
DUBUQUE 10
WOODBURY 15
IDA
SAC 20
CALHOUN 22
WEBSTER 18
HAMILTON 23
HARDIN 11
GRUNDY 18
MONONA 12
CRAWFORD 15
CARROLL 15
GREENE 17
BOONE 15
STORY 20
MARSHALL 22
TAMA 16
BENTON 15
LINN 20
JONES 23
JACKSON 20
CLINTON
HARRISON
SHELBY
AUDUBON 20
GUTHRIE 14
DALLAS 17
POLK 26
DES MOINES
JASPER 17
POWESHIEK
IOWA 20
JOHNSON
CEDAR 12
SCOTT 15
MUSCATINE
POTTAWATTAMIE 17
CASS
ADAIR
MADISON 13
WARREN
MARION 22
MAHASKA
KEOKUK 10
WASHINGTON
LOUISA 10
MILLS
MONTGOMERY
ADAMS 15
UNION 15
CLARKE 15
LUCAS 28
MONROE 10
WAPELLO
JEFFERSON 29
HENRY 18
DES MOINES 18
FREMONT
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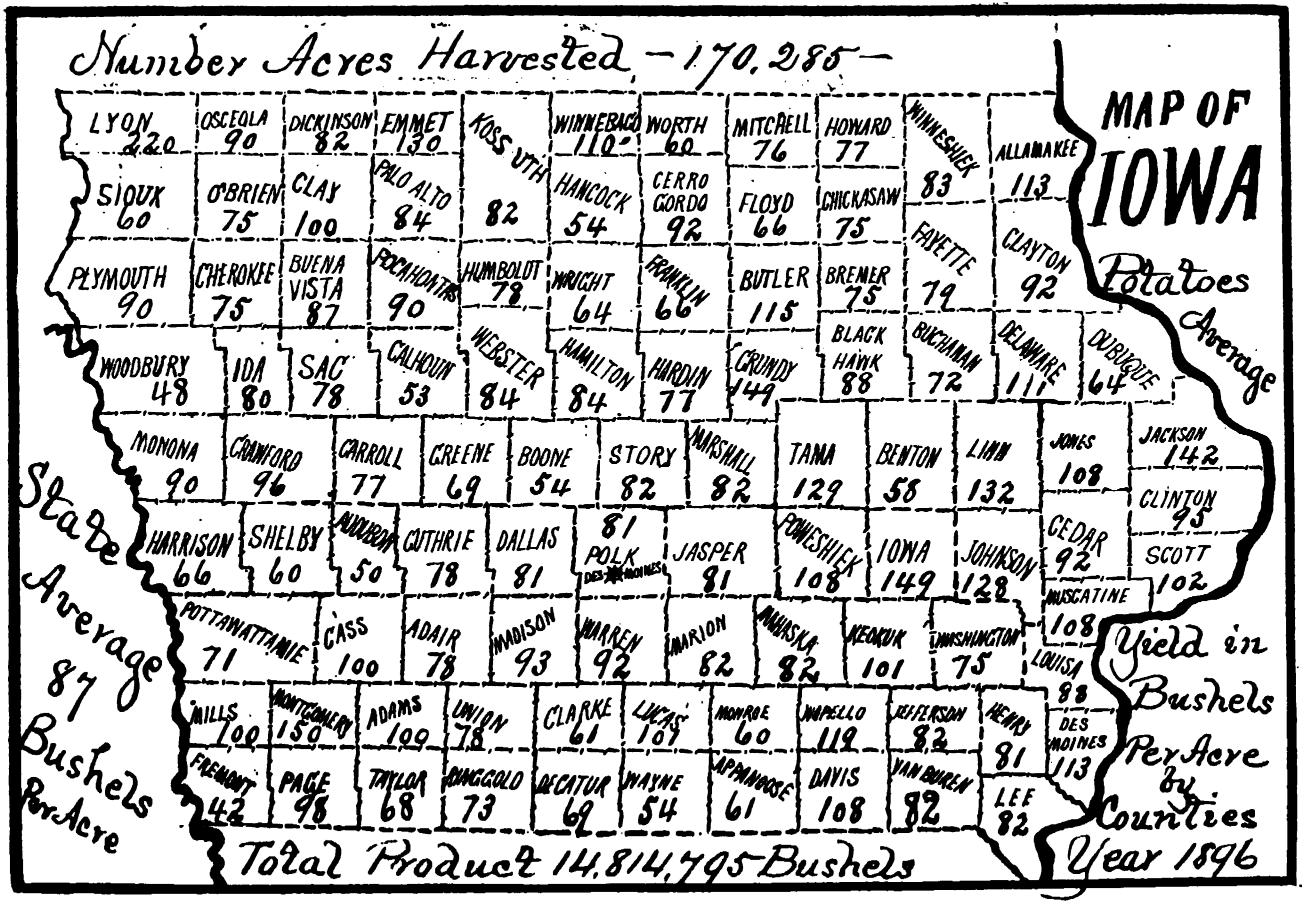
TAYLOR 22
RINGGOLD 17
DECATUR 18
WAYNE 30
APPANOOSE 15
DAVIS 15
VAN BUREN 17
LEE 11


MAP OF IOWA
Potatoes Average
Yield in Bushels Per Acre by Counties Year 1896
Number Acres Harvested — 170,285 —
Total Product 14,814,795 Bushels
State Average 87 Bushels Per Acre
LYON 220
OSCEOLA 90
DICKINSON 82
EMMET 130
KOSSUTH 82
WINNEBAGO 110
WORTH 60
MITCHELL 76
HOWARD 77
WINNESHIEK 83
ALLAMAKEE 113
SIOUX 60
O'BRIEN 75
CLAY 100
PALO ALTO 84
HANCOCK 54
CERRO GORDO 92
FLOYD 66
CHICKASAW 75
FAYETTE 79
CLAYTON 92
PLYMOUTH 90
CHEROKEE 75
BUENA VISTA 87
POCAHONTAS 90
HUMBOLDT 78
WRIGHT 64
FRANKLIN 66
BUTLER 115
BREMER 75
BLACK HAWK 88
BUCHANAN 72
DELAWARE 111
DUBUQUE 64
WOODBURY 48
IDA 80
SAC 78
CALHOUN 53
WEBSTER 84
HAMILTON 84
HARDIN 77
GRUNDY 149
MONONA 90
CRAWFORD 96
CARROLL 77
GREENE 69
BOONE 54
STORY 82
MARSHALL 82
TAMA 129
BENTON 58
LINN 132
JONES 108
JACKSON 142
CLINTON 95
HARRISON 66
SHELBY 60
AUDUBON 50
GUTHRIE 78
DALLAS 81
POLK 81
DES MOINES
JASPER 81
POWESHIEK 108
IOWA 149
JOHNSON 128
CEDAR 92
SCOTT 102
MUSCATINE 108
POTTAWATTAMIE 71
CASS 100
ADAIR 78
MADISON 93
WARREN 92
MARION 82
MAHASKA 82
KEOKUK 101
WASHINGTON 75
LOUISA 88
MILLS 100
MONTGOMERY 150
ADAMS 109
UNION 78
CLARKE 61
LUCAS 109
MONROE 60
WAPELLO 119
JEFFERSON 82
HENRY 81
DES MOINES 113
FREMONT 42
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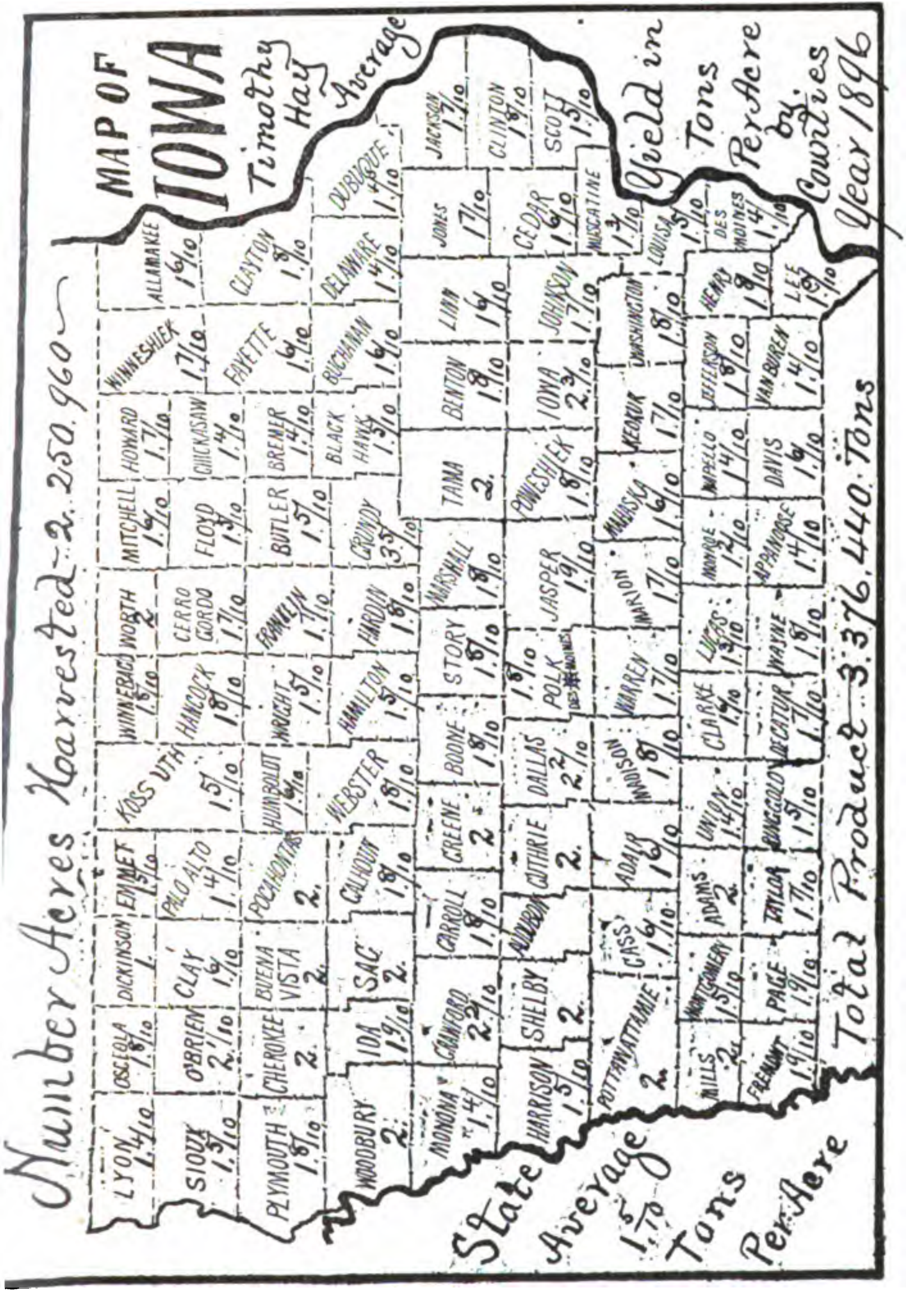
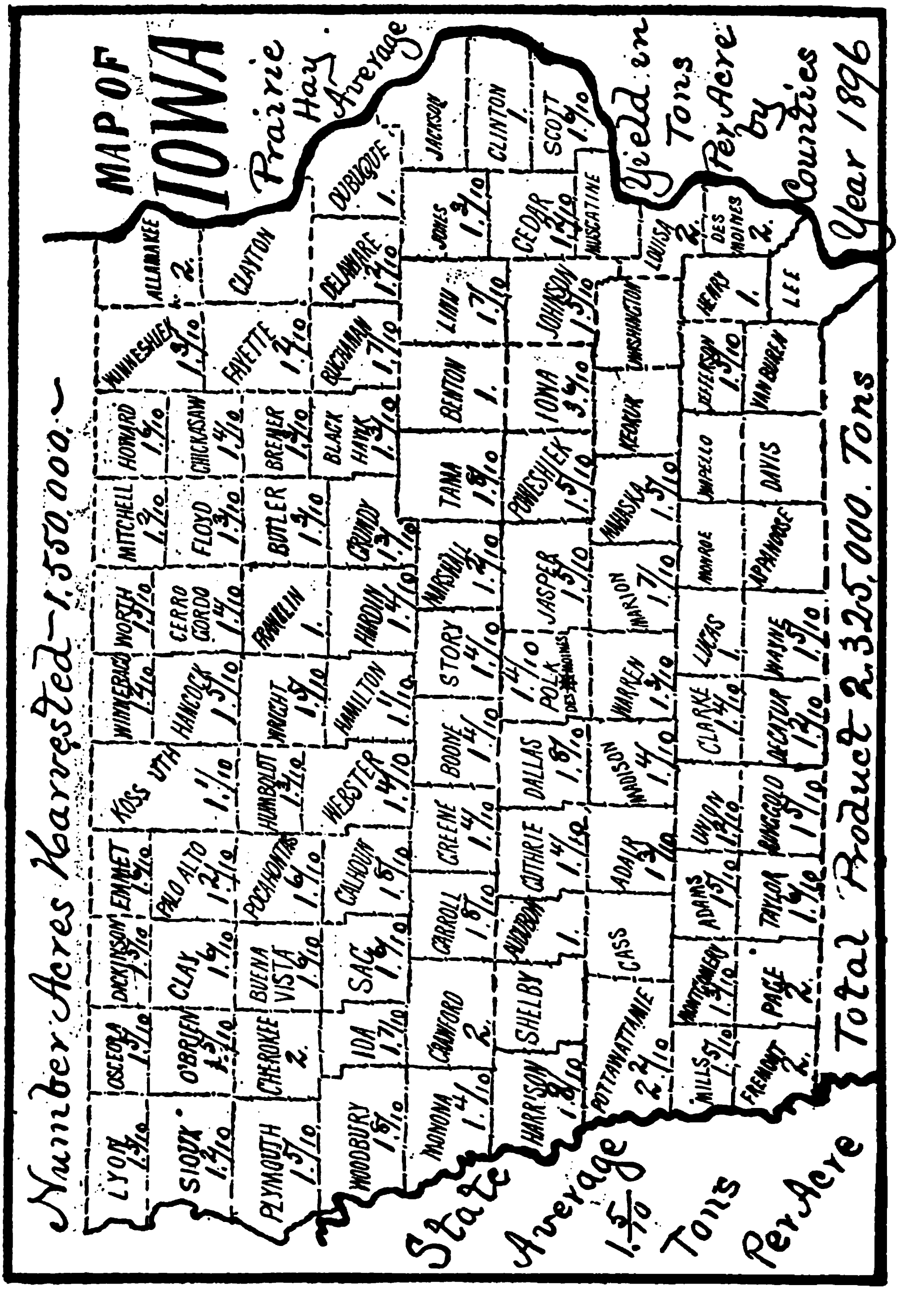
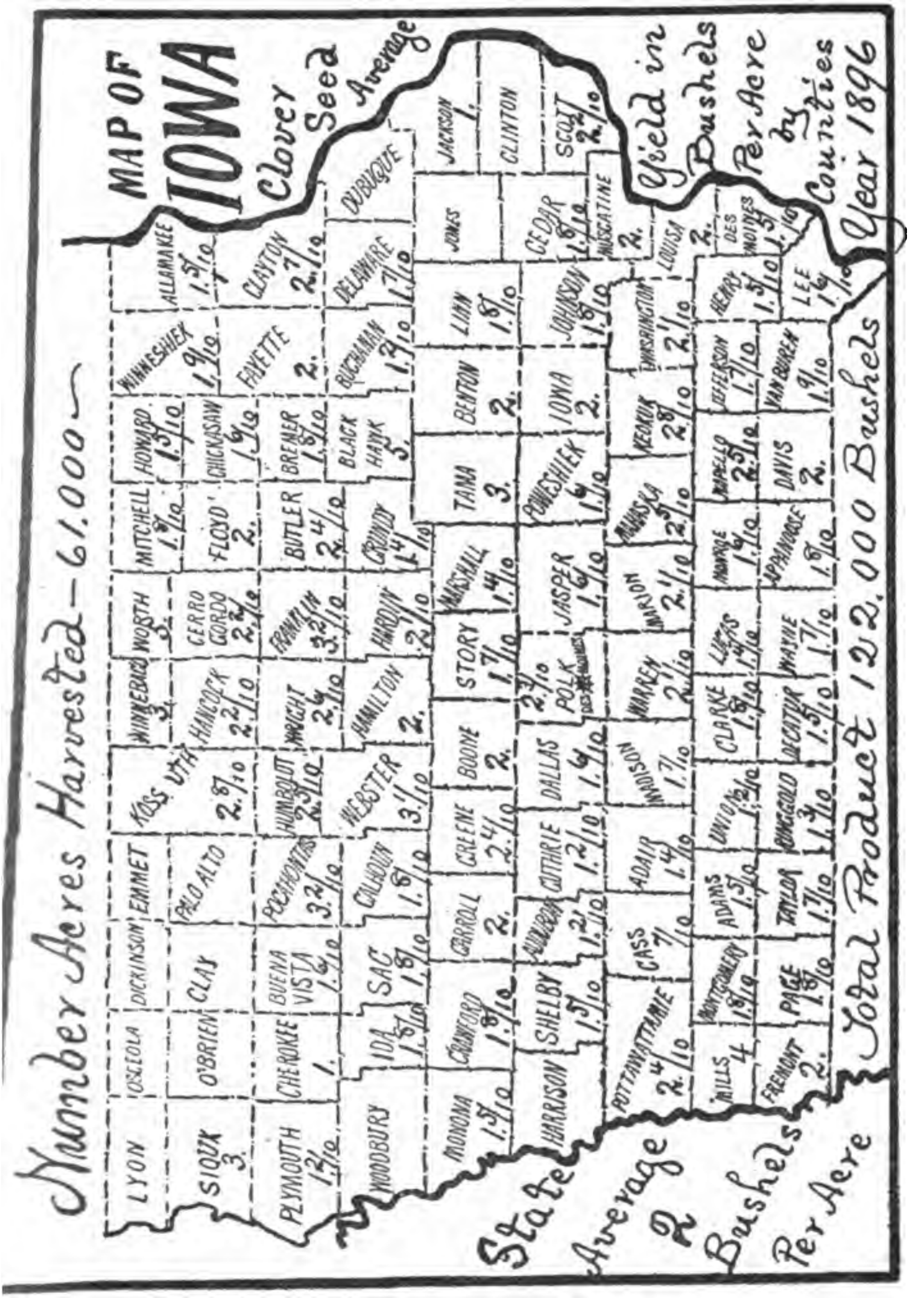
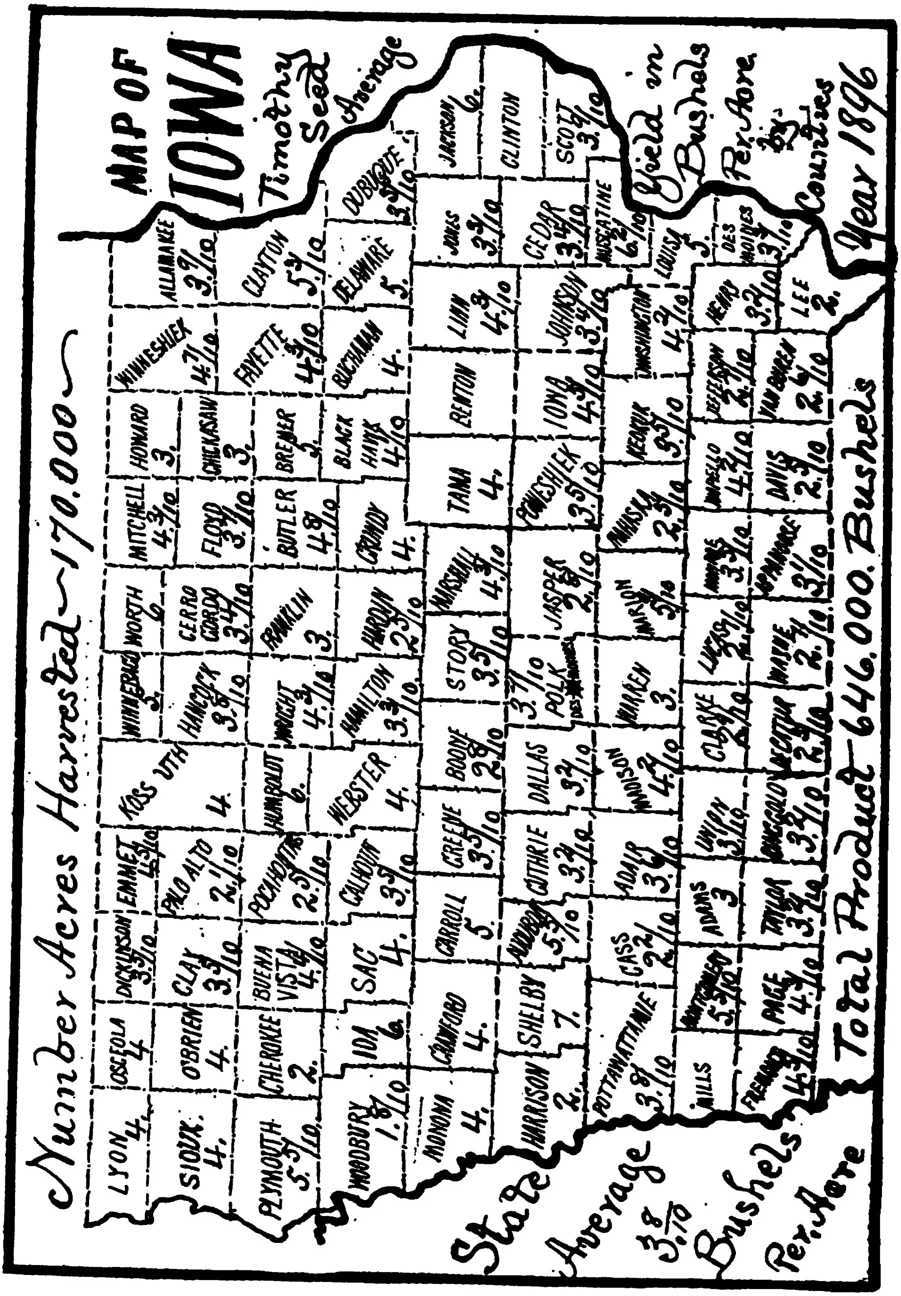
TAYLOR 68
RINGGOLD 73
DECATUR 69
WAYNE 54
APPANOOSE 61
DAVIS 108
VAN BUREN 82
LEE 82

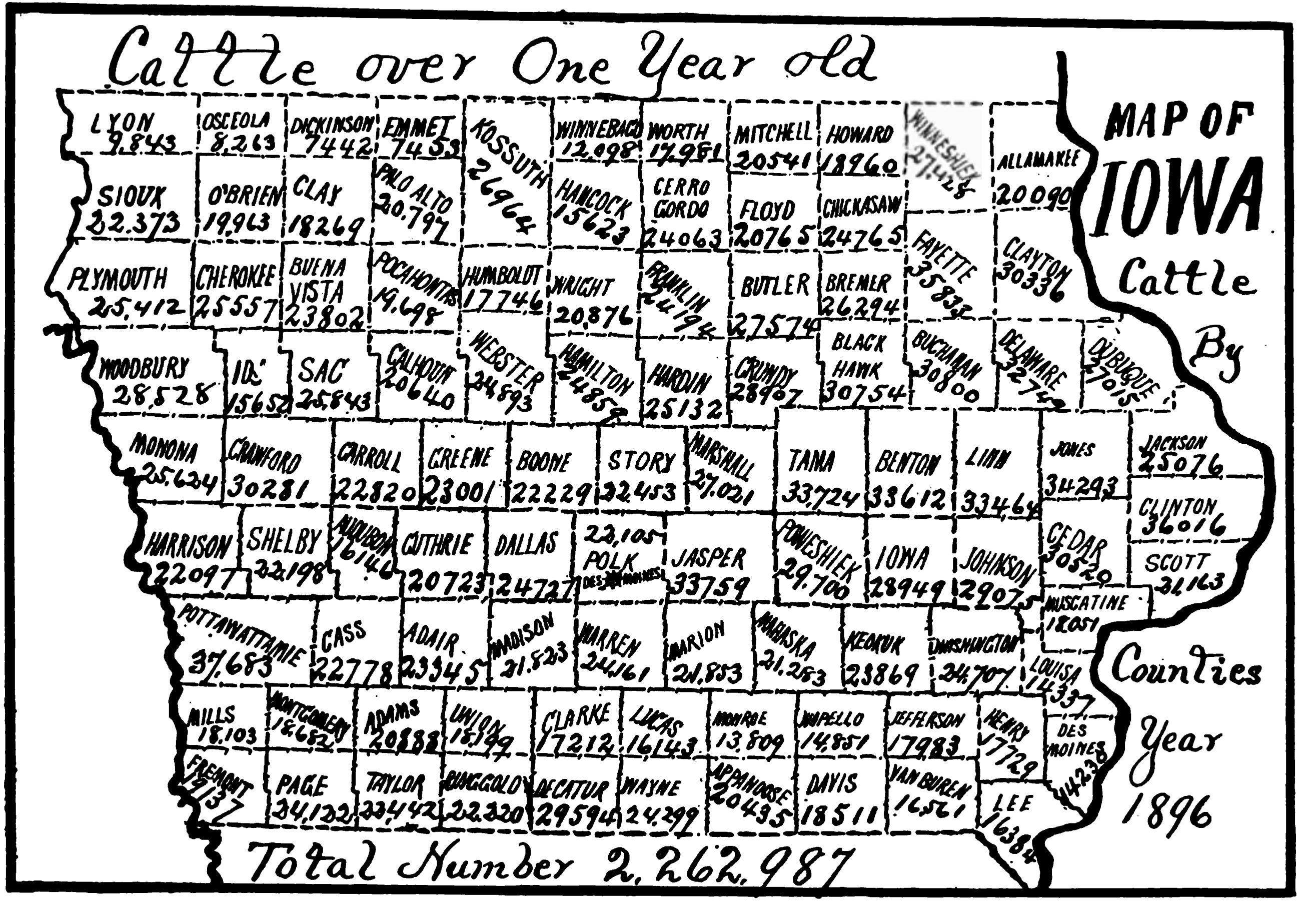
Gr	1	49.6	70	25	3.30	....	30.5	71	-2	1.77	T	31.4	55	11	32	T	....	...	-9	......	....
Gr	3	47.0	73	16	3.13	T	27.2	72	-5	1.34	2.5	29.0	56	.5	.31	T	46.7	97	-16	38.54	9.5
Gu	3	46.7	75	18	2.39	...	....	..	...	....	....	....	..	...	....	....	....	96	-11	......	....
Ha	2	46.2	72	20	4.39	.8	24.6	68	-5	2.61	7.0	27.7	52	5	1.60	1.4	45.9	96	-15	38.75	22.2
Ho	9	50.0	76	24	3.67	....	31.9	72	-4	1.00	....	33.4	58	8	.40	T	49.9	94	-10	41.81	16.1
Hu	6	47 5	74	19	3.08	.5	25.8	65	-6	2 15	7.0	30.2	52	4	.45	3.0	47.9	99	-12	36.27	17.5
In	0	45.6	72	16	3 51	T	29.5	67	-5	1.82	3.0	28.2	53	2	.49	1 9	46.3	96	-15	34.26	22.5
In	0	51.2	74	21	3.09	.	32.8	76	-11	.48	.8	35.7	64	12	.60	T	50.4	95	-12	36.71	12.6
Io	2	48.6	75	20	2.74	....	43.8	73	-1	1.16	....	33.2	66	7	.55	2.5	50.4	98	-11	29.98	....
Io	[illegible]	48.9	74	20	....	....	36 6	74	2	....	...	33.7	57	4	....	...	49.9	93	-10	......	....
Io	3	46.1	75	18	3.20	T	27.2	69	-4	2.15	7.0	29.1	52	7	.56	2.2	45.8	94	-19	42.49	16.7
Ke	1	52.0	76	27	1 71	. . .	38.2	74	3	1.01	T	36.0	65	10	.81	..	53.0	98	-8	36.77	14.3
Ke	4	51 2	76	27	2.56	....	35.4	73	4	.72	....	....	..	...	....	...	....	97	-4	....	....

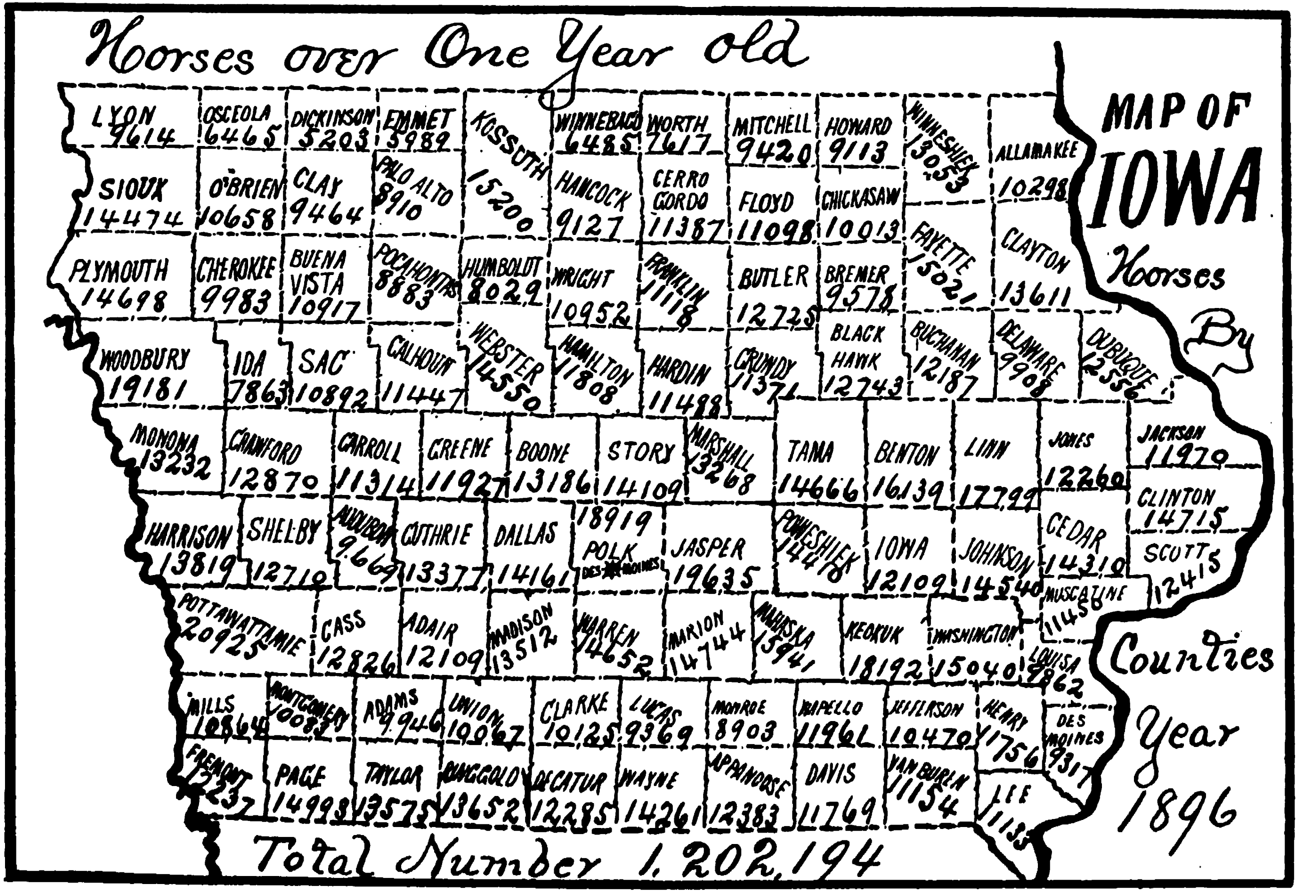

MAP OF IOWA
Timothy Hay
Average Yield in Tons Per Acre by Counties Year 1896
Number Acres Harvested - 2,250,960
Total Product 3,376,440 Tons
State Average 1 5/10 Tons Per Acre
LYON 1 4/10
OSCEOLA 1 8/10
DICKINSON 1
EMMET 1 5/10
KOSSUTH 1 5/10
WINNEBAGO 1 8/10
WORTH 2
MITCHELL 1 6/10
HOWARD 1 7/10
WINNESHIEK 1 7/10
ALLAMAKEE 1 6/10
SIOUX 1 5/10
O'BRIEN 2 1/10
CLAY 1 6/10
PALO ALTO 1 4/10
HANCOCK 1 8/10
CERRO GORDO 1 7/10
FLOYD 1 5/10
CHICKASAW 1 4/10
FAYETTE 1 6/10
CLAYTON 1 8/10
PLYMOUTH 1 8/10
CHEROKEE 2
BUENA VISTA 2
POCAHONTAS 2
HUMBOLDT 1 6/10
WRIGHT 1 5/10
FRANKLIN 1 7/10
BUTLER 1 5/10
BREMER 1 4/10
BLACK HAWK 1 5/10
BUCHANAN 1 6/10
DELAWARE 1 4/10
DUBUQUE 1 4/10
WOODBURY 2
IDA 1 9/10
SAC 2
CALHOUN 1 8/10
WEBSTER 1 8/10
HAMILTON 1 5/10
HARDIN 1 8/10
GRUNDY 1 5/10
MONONA 1 4/10
CRAWFORD 2 2/10
CARROLL 1 8/10
GREENE 2
BOONE 1 8/10
STORY 1 8/10
MARSHALL 1 8/10
TAMA 2
BENTON 1 8/10
LINN 1 6/10
JONES 1 7/10
JACKSON 1 7/10
CLINTON 1 8/10
HARRISON 1 5/10
SHELBY 2
AUDUBON
GUTHRIE 2
DALLAS 2 2/10
POLK 1 8/10
DES MOINES
JASPER 1 9/10
POWESHIEK 1 8/10
IOWA 2 3/10
JOHNSON 1 7/10
CEDAR 1 6/10
SCOTT 1 5/10
MUSCATINE 1 7/10
POTTAWATTAMIE 2
CASS 1 6/10
ADAIR 1 6/10
MADISON 1 8/10
WARREN 1 7/10
MARION 1 7/10
MAHASKA 1 6/10
KEOKUK 1 7/10
WASHINGTON 1 8/10
LOUISA 1 5/10
DES MOINES 1 4/10
MILLS 2
MONTGOMERY 1 5/10
ADAMS 2
UNION 1 4/10
CLARKE 1 6/10
LUCAS 1 3/10
MONROE 1 4/10
WAPELLO 1 4/10
JEFFERSON 1 8/10
HENRY 1 8/10
FREMONT 1 9/10
PAGE 1 9/10
TAYLOR 1 7/10
RINGGOLD 1 5/10
DECATUR 1 7/10
WAYNE 1 8/10
APPANOOSE 1 4/10
DAVIS 1 6/10
VAN BUREN 1 4/10
LEE 1 9/10

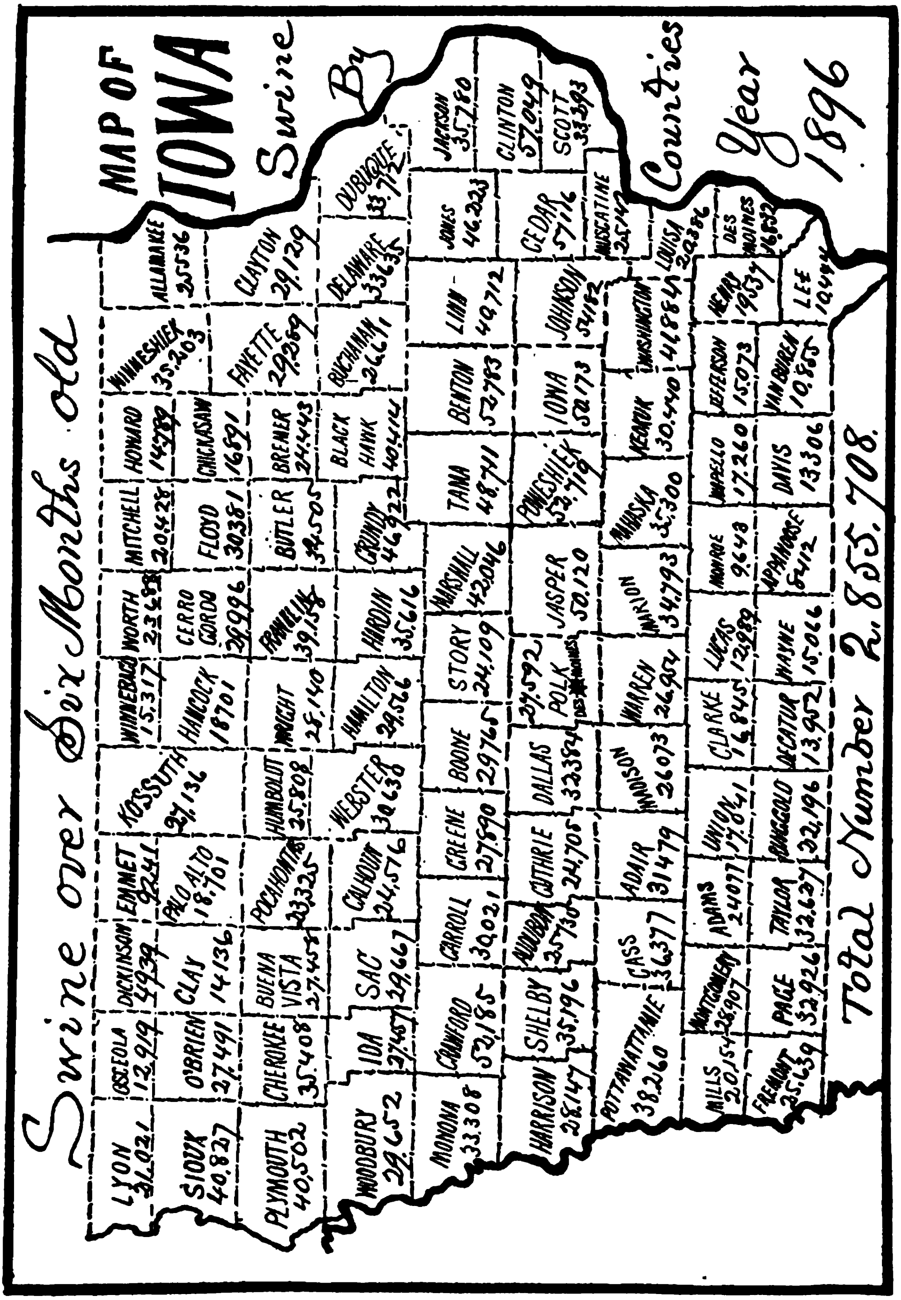

MAP OF IOWA
Prairie Hay Average Yield in Tons Per Acre by Counties Year 1896
Number Acres Harvested—1,550,000.
Total Product 2,325,000. Tons
State Average 1.5/10 Tons Per Acre
LYON 1.3/10
OSCEOLA 1.5/10
DICKINSON 1.5/10
EMMET 1.5/10
KOSSUTH 1.1/10
WINNEBAGO 1.4/10
WORTH 1.7/10
MITCHELL 1.2/10
HOWARD 1.6/10
WINNESHIEK 1.9/10
ALLAMAKEE 2.
SIOUX 1.2/10
O'BRIEN 1.5/10
CLAY 1.6/10
PALO ALTO 1.2/10
HANCOCK 1.5/10
CERRO GORDO 1.4/10
FLOYD 1.3/10
CHICKASAW 1.4/10
FAYETTE 1.4/10
CLAYTON
PLYMOUTH 1.5/10
CHEROKEE 2.
BUENA VISTA 1.6/10
POCAHONTAS 1.6/10
HUMBOLDT 1.2/10
WRIGHT 1.8/10
FRANKLIN 1.
BUTLER 1.4/10
BREMER 1.5/10
BUCHANAN 1.7/10
DELAWARE 1.7/10
DUBUQUE 1.
WOODBURY 1.8/10
IDA 1.7/10
SAC 1.6/10
CALHOUN 1.8/10
WEBSTER 1.4/10
HAMILTON 1.1/10
HARDIN 1.4/10
GRUNDY 1.7/10
BLACK HAWK 1.3/10
JACKSON
MONONA 1.4/10
CRAWFORD 2.
CARROLL 1.8/10
GREENE 1.4/10
BOONE 1.4/10
STORY 1.4/10
MARSHALL 1.2/10
TAMA 1.8/10
BENTON 1.
LINN 1.7/10
JONES 1.3/10
CLINTON 1.
HARRISON 1.9/10
SHELBY
AUDUBON 1.
GUTHRIE 1.4/10
DALLAS 1.8/10
POLK 1.4/10
DES MOINES
JASPER 1.5/10
POWESHIEK 1.5/10
IOWA 1.3/10
JOHNSON 1.5/10
CEDAR 1.2/10
SCOTT 1.9/10
MUSCATINE
POTTAWATTAMIE 2.4/10
CASS
ADAIR 1.3/10
MADISON 1.4/10
WARREN 1.3/10
MARION 1.7/10
MAHASKA 1.5/10
KEOKUK
WASHINGTON
LOUISA 2.
MILLS 1.5/10
MONTGOMERY 1.3/10
ADAMS 1.5/10
UNION 1.2/10
CLARKE 1.4/10
LUCAS 1.
MONROE
WAPELLO
JEFFERSON 1.3/10
HENRY 1.
DES MOINES 2.
FREMONT 2.
PAGE 2.
TAYLOR 1.4/10
RINGGOLD 1.5/10
DECATUR 1.4/10
WAYNE 1.5/10
APPANOOSE
DAVIS
VAN BUREN
LEE

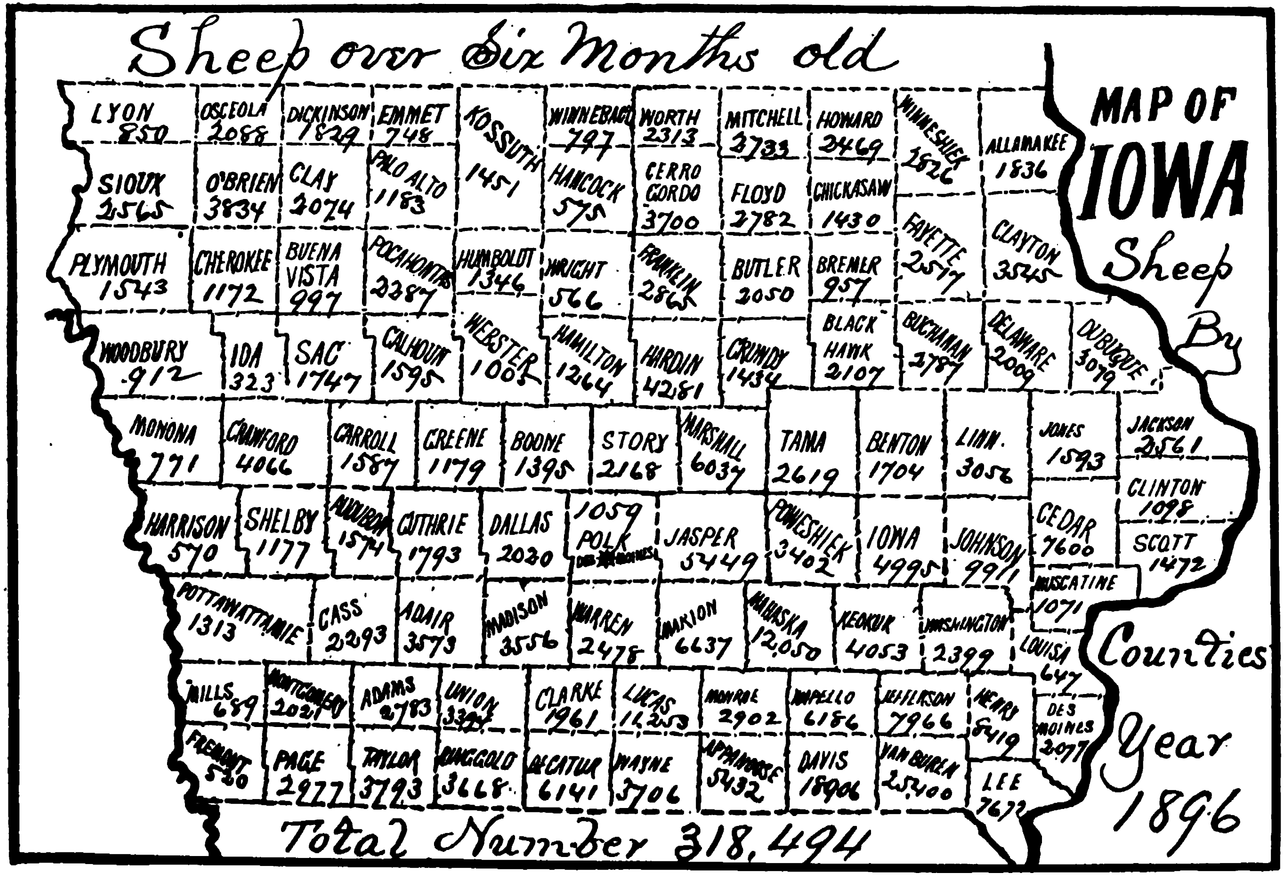

MAP OF IOWA
Clover Seed Average Yield in Bushels Per Acre by Counties Year 1896
Number Acres Harvested - 61,000
Total Product 122,000 Bushels
State Average 2 Bushels Per Acre
LYON
OSCEOLA
DICKINSON
EMMET
KOSSUTH 2.8/10
WINNEBAGO 3.
WORTH 3.
MITCHELL 1.8/10
HOWARD 1.5/10
WINNESHIEK 1.9/10
ALLAMAKEE 1.5/10
SIOUX 3.
O'BRIEN
CLAY
PALO ALTO
HANCOCK 2.2/10
CERRO GORDO 2.2/10
FLOYD 2.
CHICKASAW 1.6/10
FAYETTE 2.
CLAYTON 2.7/10
PLYMOUTH 1.2/10
CHEROKEE 1.
BUENA VISTA 1.6/10
POCAHONTAS 3.2/10
HUMBOLDT 2.3/10
WRIGHT 2.4/10
FRANKLIN 3.2/10
BUTLER 2.4/10
BREMER 1.8/10
BLACK HAWK 3.
BUCHANAN 1.9/10
DELAWARE 1.7/10
DUBUQUE
WOODBURY
IDA 1.8/10
SAC 1.8/10
CALHOUN 1.8/10
WEBSTER 3.1/10
HAMILTON 2.
HARDIN 2.1/10
GRUNDY 1.4/10
TAMA 3.
BENTON 2.
LINN 1.8/10
JONES
JACKSON 1.
CLINTON
MONONA 1.5/10
CRAWFORD 1.8/10
CARROLL 2.
GREENE 2.4/10
BOONE 2.
STORY 1.7/10
MARSHALL 1.4/10
HARRISON
SHELBY 1.5/10
AUDUBON 1.2/10
GUTHRIE 1.2/10
DALLAS 1.9/10
POLK 2.3/10
DES MOINES
JASPER 1.6/10
POWESHIEK 1.6/10
IOWA 2.
JOHNSON 1.8/10
CEDAR 1.8/10
SCOTT 2.2/10
MUSCATINE 2.
POTTAWATTAMIE 2.4/10
CASS 7/10
ADAIR 1.4/10
MADISON 1.7/10
WARREN 2.1/10
MARION 2.1/10
MAHASKA 2.3/10
KEOKUK 2.8/10
WASHINGTON 2.1/10
LOUISA 2.
MILLS 4
MONTGOMERY 1.8/10
ADAMS 1.5/10
UNION 1.2/10
CLARKE 1.8/10
LUCAS 1.4/10
MONROE 1.9/10
WAPELLO 2.5/10
JEFFERSON 1.7/10
HENRY 1.5/10
DES MOINES 1.5/10
FREMONT 2.
PAGE 1.8/10
TAYLOR 1.7/10
RINGGOLD 1.3/10
DECATUR 1.5/10
WAYNE 1.7/10
APPANOOSE 1.8/10
DAVIS 2.
VAN BUREN 1.9/10
LEE 1.6/10


MAP OF IOWA
Timothy Seed Average Yield in Bushels Per Acre by Counties Year 1896
Number Acres Harvested—170,000
Total Product 646,000 Bushels
State Average 3.8/10 Bushels Per Acre
LYON 4.
OSCEOLA 4
DICKINSON 3 5/10
EMMET 4 5/10
KOSSUTH 4.
WINNEBAGO 5.
WORTH 6.
MITCHELL 4 3/10
HOWARD 3.
WINNESHIEK 4 7/10
ALLAMAKEE 3 9/10
SIOUX 4.
O'BRIEN 4.
CLAY 3 9/10
PALO ALTO 2 1/10
HANCOCK 3 8/10
CERRO GORDO 3 4/10
FLOYD 3 4/10
CHICKASAW 3.
FAYETTE 4 3/10
CLAYTON 5 7/10
PLYMOUTH 5 5/10
CHEROKEE 2.
BUENA VISTA 4 4/10
POCAHONTAS 2 5/10
HUMBOLDT 6.
WRIGHT 4 3/10
FRANKLIN 3.
BUTLER 4 8/10
BREMER 5.
BLACK HAWK 4 1/10
BUCHANAN 4.
DELAWARE 5.
DUBUQUE 3 9/10
WOODBURY 1 8/10
IDA 6.
SAC 4.
CALHOUN 3 9/10
WEBSTER 4.
HAMILTON 3 9/10
HARDIN 2 3/10
GRUNDY 4.
TAMA 4.
BENTON
LINN 4 3/10
JONES 3 4/10
JACKSON 6.
MONONA 4.
CRAWFORD 4.
CARROLL 5.
GREENE 3 5/10
BOONE 2 8/10
STORY 3 5/10
MARSHALL 4 3/10
POWESHIEK 3 5/10
IOWA 4 3/10
JOHNSON 3 4/10
CEDAR 3 4/10
CLINTON
SCOTT 3 4/10
HARRISON 2.
SHELBY 7.
AUDUBON 5 3/10
GUTHRIE 3 4/10
DALLAS 3 4/10
POLK 3 7/10
DES MOINES
JASPER 2 8/10
MAHASKA 2 5/10
KEOKUK 3 5/10
WASHINGTON 4 2/10
MUSCATINE 6 1/10
LOUISA 5.
POTTAWATTAMIE 3 8/10
CASS 2 2/10
ADAIR 3 9/10
MADISON 4 2/10
WARREN 3.
MARION 5 3/10
MONROE 3 1/10
WAPELLO 4 2/10
JEFFERSON 2 7/10
HENRY 3 2/10
DES MOINES 3 7/10
MILLS
MONTGOMERY 5 3/10
ADAMS 3
UNION 3 1/10
CLARKE 2 4/10
LUCAS 2 9/10
FREMONT 4 5/10
PAGE 4 1/10
TAYLOR 3 4/10
RINGGOLD 3 2/10
DECATUR 2 9/10
WAYNE 2 1/10
APPANOOSE 3 1/10
DAVIS 2 5/10
VAN BUREN 2 4/10
LEE 2.


Cattle over One Year old
MAP OF IOWA
Cattle
By
Counties
Year
1896
LYON 9.843
OSCEOLA 8,263
DICKINSON 7442
EMMET 7453
KOSSUTH 26964
WINNEBAGO 12,098
WORTH 17,981
MITCHELL 20541
HOWARD 18960
WINNESHIEK 27,428
ALLAMAKEE 20090
SIOUX 22.373
O'BRIEN 19,963
CLAY 18269
PALO ALTO 20.797
HANCOCK 15623
CERRO GORDO 24063
FLOYD 20765
CHICKASAW 24765
FAYETTE 35833
CLAYTON 30336
PLYMOUTH 25,412
CHEROKEE 25557
BUENA VISTA 23802
POCAHONTAS 19,698
HUMBOLDT 17746
WRIGHT 20,876
FRANKLIN 24194
BUTLER 27574
BREMER 26294
WOODBURY 28,528
IDA 15652
SAC 25,843
CALHOUN 20640
WEBSTER 24893
HAMILTON 24858
HARDIN 25132
GRUNDY 28907
BLACK HAWK 30754
BUCHANAN 30800
DELAWARE 32742
DUBUQUE 27015
MONONA 25,624
CRAWFORD 30281
CARROLL 22820
GREENE 23001
BOONE 22229
STORY 22,453
MARSHALL 27,021
TAMA 33,724
BENTON 33612
LINN 33,464
JONES 34293
JACKSON 25076
HARRISON 22097
SHELBY 22,198
AUDUBON 16146
GUTHRIE 20723
DALLAS 24727
22,105 POLK
DES MOINES
JASPER 33759
POWESHIEK 29,700
IOWA 28949
JOHNSON 29075
CEDAR 30520
CLINTON 36016
SCOTT 31,163
MUSCATINE 18051
POTTAWATTAMIE 37,683
CASS 22778
ADAIR 23345
MADISON 21.823
WARREN 24,161
MARION 21,853
MAHASKA 21,283
KEOKUK 23869
WASHINGTON 24,707
LOUISA 14337
MILLS 18,103
MONTGOMERY 18,682
ADAMS 20888
UNION 18,199
CLARKE 17212
LUCAS 16,143
MONROE 13,809
WAPELLO 14,851
JEFFERSON 17983
HENRY 17729
DES MOINES 14238
FREMONT 19137
PAGE 34,122
TAYLOR 22,442
RINGGOLD 22,320
DECATUR 29594
WAYNE 24,299
APPANOOSE 20435
DAVIS 18511
VAN BUREN 16,561
LEE 16384
Total Number 2,262,987


Horses over One Year old
MAP OF IOWA
Horses By Counties
Year 1896
LYON 9614
OSCEOLA 6465
DICKINSON 5203
EMMET 5989
KOSSUTH 15200
WINNEBAGO 6485
WORTH 7617
MITCHELL 9420
HOWARD 9113
WINNESHIEK 13053
ALLAMAKEE 10298
SIOUX 14474
O'BRIEN 10658
CLAY 9464
PALO ALTO 8910
HANCOCK 9127
CERRO GORDO 11387
FLOYD 11098
CHICKASAW 10013
FAYETTE 15021
CLAYTON 13611
PLYMOUTH 14698
CHEROKEE 9983
BUENA VISTA 10917
POCAHONTAS 8883
HUMBOLDT 8029
WRIGHT 10952
FRANKLIN 11118
BUTLER 12725
BREMER 9578
BLACK HAWK 12743
BUCHANAN 12187
DELAWARE 9908
DUBUQUE 12556
WOODBURY 19181
IDA 7863
SAC 10892
CALHOUN 11447
WEBSTER 14550
HAMILTON 11808
HARDIN 11488
GRUNDY 11371
MONONA 13232
CRAWFORD 12870
CARROLL 11314
GREENE 11927
BOONE 13186
STORY 14109
MARSHALL 13268
TAMA 14666
BENTON 16139
LINN 17799
JONES 12260
JACKSON 11970
CLINTON 14715
HARRISON 13819
SHELBY 12710
AUDUBON 9669
GUTHRIE 13377
DALLAS 14161
18919 POLK
DES MOINES
JASPER 19635
POWESHIEK 14418
IOWA 12109
JOHNSON 14540
CEDAR 14310
SCOTT 12415
MUSCATINE 11456
POTTAWATTAMIE 20925
CASS 12826
ADAIR 12109
MADISON 13512
WARREN 14652
MARION 14744
MAHASKA 15941
KEOKUK 18192
WASHINGTON 15040
LOUISA 9862
MILLS 10864
MONTGOMERY 10082
ADAMS 9946
UNION 10067
CLARKE 10125
LUCAS 9369
MONROE 8903
WAPELLO 11961
JEFFERSON 10470
HENRY 11756
DES MOINES 9317
FREMONT 12237
PAGE 14993
TAYLOR 13575
RINGGOLD 13652
DECATUR 12285
WAYNE 14261
APPANOOSE 12383
DAVIS 11769
VAN BUREN 11154
LEE 11135
Total Number 1,202,194


MAP OF IOWA
Swine By Counties
Year 1896
Swine over Six Months old
LYON 32,021
OSCEOLA 12,919
DICKINSON 4939
EMMET 9241
KOSSUTH 27,136
WINNEBAGO 15,317
WORTH 23,628
MITCHELL 20,428
HOWARD 14,789
WINNESHIEK 35,203
ALLAMAKEE 25536
SIOUX 40,827
O'BRIEN 27,491
CLAY 14136
PALO ALTO 18,701
HANCOCK 18701
CERRO GORDO 26996
FLOYD 30381
CHICKASAW 16591
FAYETTE 29,269
CLAYTON 29,129
PLYMOUTH 40,502
CHEROKEE 35408
BUENA VISTA 27,452
POCAHONTAS 23,325
HUMBOLDT 25,808
WRIGHT 25,140
FRANKLIN 39,158
BUTLER 34,505
BREMER 24,443
BUCHANAN 26,611
DELAWARE 33635
DUBUQUE 33,712
WOODBURY 29,652
IDA 27,457
SAC 29,667
CALHOUN 24,576
WEBSTER 30,638
HAMILTON 29,526
HARDIN 35,616
GRUNDY 46,922
BLACK HAWK 40,414
MONONA 33,308
CRAWFORD 52,185
CARROLL 30,021
GREENE 27,890
BOONE 29,765
STORY 24,109
MARSHALL 42,046
TAMA 48,741
BENTON 52,783
LINN 49,712
JONES 46,223
JACKSON 35,780
CLINTON 57,049
HARRISON 28,147
SHELBY 35,196
AUDUBON 25,730
GUTHRIE 24,705
DALLAS 32,384
POLK 27,592
DES MOINES
JASPER 50,120
POWESHIEK 52,719
IOWA 52,173
JOHNSON 54,182
CEDAR 57,116
SCOTT 33,393
MUSCATINE 25,141
POTTAWATTAMIE 38,260
CASS 36,377
ADAIR 31479
MADISON 26,073
WARREN 26,954
MARION 34,793
MAHASKA 35,300
KEOKUK 30,440
WASHINGTON 41,884
LOUISA 20,386
MILLS 20,154
MONTGOMERY 28,907
ADAMS 24,077
UNION 17,841
CLARKE 16,845
LUCAS 12,989
MONROE 9,643
WAPELLO 17,260
JEFFERSON 15,073
HENRY 19,531
DES MOINES 16,832
FREMONT 35,639
PAGE 32,926
TAYLOR 32,627
RINGGOLD 22,196
DECATUR 13,952
WAYNE 15,066
APPANOOSE 8412
DAVIS 13,306
VAN BUREN 10,865
LEE 10,444
Total Number 2,855,708.


Sheep over Six Months old
MAP OF IOWA
Sheep By Counties
Year 1896
LYON 850
OSCEOLA 2088
DICKINSON 7829
EMMET 748
KOSSUTH 1451
WINNEBAGO 797
WORTH 2313
MITCHELL 3733
HOWARD 2469
WINNESHIEK 2526
ALLAMAKEE 1836
SIOUX 2565
O'BRIEN 3834
CLAY 2074
PALO ALTO 1183
HANCOCK 575
CERRO GORDO 3700
FLOYD 2782
CHICKASAW 1430
FAYETTE 2577
CLAYTON 3545
PLYMOUTH 1543
CHEROKEE 1172
BUENA VISTA 997
POCAHONTAS 2387
HUMBOLDT 1346
WRIGHT 566
FRANKLIN 2865
BUTLER 2050
BREMER 957
BLACK HAWK 2107
BUCHANAN 2787
DELAWARE 2009
DUBUQUE 3079
WOODBURY 912
IDA 323
SAC 1747
CALHOUN 1595
WEBSTER 1005
HAMILTON 1264
HARDIN 4281
GRUNDY 1434
MONONA 771
CRAWFORD 4066
CARROLL 1587
GREENE 1179
BOONE 1395
STORY 2168
MARSHALL 6037
TAMA 2619
BENTON 1704
LINN 3056
JONES 1593
JACKSON 2561
CLINTON 1098
HARRISON 570
SHELBY 1177
AUDUBON 1574
GUTHRIE 1793
DALLAS 2020
1059 POLK DES MOINES
JASPER 5449
POWESHIEK 3402
IOWA 4995
JOHNSON 9911
CEDAR 7600
SCOTT 1472
MUSCATINE 1071
POTTAWATTAMIE 1313
CASS 2293
ADAIR 3573
MADISON 3556
WARREN 2478
MARION 6637
MAHASKA 12,050
KEOKUK 4053
WASHINGTON 2399
LOUISA 647
MILLS 689
MONTGOMERY 2021
ADAMS 2783
UNION 3324
CLARKE 1961
LUCAS 11,253
MONROE 2902
WAPELLO 6186
JEFFERSON 7966
HENRY 5419
DES MOINES 2077
FREMONT 580
PAGE 2977
TAYLOR 3793
RINGGOLD 3668
DECATUR 6141
WAYNE 3706
APPANOOSE 5432
DAVIS 18906
VAN BUREN 25,400
LEE 7677
Total Number 318,494

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UNITED STATES

DEPARTMENT OF AGRICULTURE,

WEATHER BUREAU.

ANNUAL REPORT

OF THE

Iowa Weather and Crop Service

IN CO-OPERATION WITH THE

UNITED STATES WEATHER BUREAU,

FOR THE YEAR 1897.

JOHN R. SAGE,
Director.

GEO. M. CHAPPEL, M. D.,
Local Forecast Official U. S. Weather Bureau,
Assistant Director.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

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F. R. CONAWAY, STATE PRINTER.
1898.

STATE OF IOWA,
OFFICE OF THE WEATHER AND CROP SERVICE,
DES MOINES, March 30, 1898.

To His Excellency, Leslie M. Shaw, Governor of Iowa:

SIR—In accordance with the requirements of the law, we have the honor to submit herewith the eighth annual report of the Iowa Weather and Crop Service for the year 1897.

We are, sir, very respectfully, your obedient servants,

JOHN R. SAGE,
Director.

GEO. M. CHAPPEL,
Local Forecast Official U. S. Weather Bureau,
Assistant Director.

ANNUAL REPORT, 1897.

The meteorological and statistical data contained in this annual report have been compiled from the monthly and weekly bulletins issued by the Iowa Weather and Crop Service, in co-operation with the Weather Bureau of the U. S. Department of Agriculture. In this condensed form the matter will be especially valuable and convenient for reference and comparison in future years, and that is the special purpose of this compilation.

Steady progress has been made during the year on all lines within the field of work for which this service was established. The work of meteorological observation has been carried on at 135 stations, including six regular stations of the U. S. Weather bureau. Voluntary observers at 129 stations are supplied with government or state instruments, and from the most of them reports are received with a great degree of promptness and regularity. As an auxiliary to this corps of meteorological observers, this service includes over 800 weekly weather-crop observers and monthly crop correspondents. The public spirit displayed by this small army of unpaid observers and reporters is deserving of high praise and just recognition.

The issues of the Monthly Review and weekly Crop Bulletins have been steadily increased to meet the public demand for those publications. The distribution of the Review amounted, during the year, to an average of over 2,500 copies per month, and of the Bulletin the weekly issues amounted to over 2,300 copies. The summaries of the weekly crop reports were very widely disseminated through the press of this state, and the leading daily and commercial papers of the whole country. The value of the climate and crop reports of the foremost agricultural state in the union is fully recognized by all classes of people engaged in commerce or production.

At the close of the year, daily forecasts were received by telegraph at 112 stations; and forecasts were distributed by mail from these telegraph stations to more than 1,000 post-offices within this state. By these agencies a very large percentage of the people received the forecasts in time to be serviceable.

Following is a list of stations equipped with meteorological instruments, and the names of observers from whom reports were received during the year 1897.

METEOROLOGICAL STATIONS AND OBSERVERS.

STATIONS.	OBSERVERS.	STATIONS.	OBSERVERS.
Adair	F. L. Morrison.	Keosauqua	Prof. J. H. Landes.
Afton	Hon. N. W. Rowell.	Knoxville	Casey and Reaver.
Albia	Cal. Koontz.	Lamoni	T. J. Fitzpatrick.
Algona	C. D Pettibone.	Le Claire	River Observer.
Alta	D. E. Hadden.	Lansing	G. H. Markley.
Alta (near)	W. J. Minard.	Larchwood	E. W. Stokes.
Amana	Conrad Schadt.	Larrabee	H. B. Strever.
Ames	Exp. Station.	Lenox	J. L Hurley.
Ames (6 miles s.e)	Isaac Young.	Le Mars	Dr. T. E. Cole.
Atlantic	J. W. Love.	‡Linn Grove	Rev. J. W. Hubbard.
Audubon	F. P. Hocker.	Logan	Mrs. M B. Stern.
Belknap	A. W. Rankin.	Malvern	R. F. Norton.
Belle Plaine	S P. Vandike.	Maquoketa	Dr. A. B. Bowen.
Bonaparte	Hon. B R Vale.	Mason City	B. F. Gibbs.
Britt	G. P. Hardwick.	Marshalltown	C. M. Cook.
Burlington	Prof. H. H. Severn.	Millman	W. H. Shaul.
Carroll	Moses Simon.	Monticello	A. Matthiessen.
Charles City	H. C. Andresen.	Mooar	F. G. Thomas.
Cedar Falls	Prof. A. C. Page.	Mount Vernon	Prof A. Collin.
Cedar Rapids	Electric L. & Power Co.	Mt. Ayr	A. F. Beard.
Centerville	Prof. H. E. Reister.	Mt. Pleasant	Dr Max E. Witte.
Chariton	Hon. S. H. Mallory.	Neola	J. H Garland, Jr.
Clarinda	A. S. Van Sandt.	New Hampton	C. L. Gabrilsen.
Clear Lake	Wm. Gray.	Newton	A. Lufkin.
Clinton	Luke Roberts.	Northwood	A. L. Thompson.
College Springs	A. M. Finley.	Odebolt	E. Starner.
Corning	John W. Bixby.	Ogden	E. Sayre.
Council Bluffs	J. B. Rishel.	Omaha, Neb.	*L. A. Welch.
Cresco	Gregory Marshall.	Osceola	A. W. Lewis.
Davenport	*Geo. E. Hunt.	Ovid	H. C. Miller.
Delaware	Wm Ball.	Osage	G D. Pattingill.
Decorah	F. H Baker.	Oskaloosa	Jos. Boyd
Denison	Wm. A. McHenry.	Ottumwa	Dr. J. F Herrick.
Des Moines	*Geo. M. Chappel, M. D.	Plover	J. S. Smith.
De Soto	R. D. Minard.	Portsmouth	J. W. Dahlheimer.
Dows	R. E. Fuller	Primghar	Lewis Clarke.
Dubuque	*L. M Tarr.	Red Oak	Geo. W Holt.
Eldora	Prof. C. F. Woodward.	Reinbeck	Dr. L. B Hathaway.
Elkader	Chas. Reinecke.	Rock Rapids	W. C. Wyckoff.
Estherville	M. L. Archer.	Rockwell City	Prof. G. B. Rigg.
Exira	G. W. Guernsey.	Ruthven	Ora Taylor.
Fairfield	Charles J. Fulton.	Seymour	Mrs C. A. Conger.
Fayette	R. Z Latimer.	Sibley	H. G Doolittle.
Ft. Madison	Miss L. A. McCready.	Sidney	G. V. Swearingen.
Fonda	Chas. F Linnan.	Sigourney	Prof. E. H. Griffin.
Forest City	J. A. Peters.	Sioux City	*U. G. Purssell.
Fredericksburg	C. E Wright.	Sac City	Dr. C. Brown.
Galva	Jay Crowley.	Spencer	S. Gillespie.
Garden Grove	M. Wemple.	Spirit Lake	W. C. Drummond.
Gladbrook	Geo. F. Parker.	Stuart	H. M. Bartlett.
Glenwood	J. P. Jackson.	Tara	J. L. Haynes.
†Grand Meadow	F. L Williams.	Thurman	C. R. Paul.
Greene	J. L. Cole.	Toledo	Chas. Mason.
Greenfield	J. G Culver.	Vinton	T. F. McCune.
Grinnell	Prof. S. J. Buck.	Villisca	J F. McCartney.
Grundy Center	Geo. F. Ellis.	Washington	Wm. A. Cook.
Guthrie Center	Henry Priebe.	Washta	H. L. Felter.
Hampton	E C. Grenelle.	Waterloo	M L. Newton.
Hedrick	J T. Brooks.	Waverly	H. S. Hoover.
Hawkeye	Miss I. Whorley.	Waukee	N. C. Wragg.
Hopeville	M. T. Ashley.	Webster City	Louis Frank.
Humboldt	H. S. Wells.	Whitten	Dr Frank P. Butler.
Independence	E. F. Wulfke.	Wilton Junction	J. M. Rider.
Indianola	Prof J. L. Tilton.	Winterset	W. W. McKnight.
Iowa City	Prof. A. A. Veblen.	West Bend	Phil. Dorweiler.
Iowa City	Mrs. C. M. Hobby.	West Union	J. W. Bopp.
Iowa Falls	J. B. Parmelee.	West Branch	A. A. Madson.
Keokuk	*Fred Z. Gosewisch.		

*U. S. Weather Bureau. †Postville P. O. ‡Mt. Vernon P. O.

WEATHER-CROP OBSERVERS.

STATIONS.	OBSERVERS.	STATIONS.	OBSERVERS.
Agency	J. H. Van Zant.	Lockridge	John F. Farman.
Albia	Wm. Mercer.	Marshalltown	Hon. S. B. Packard.
Alta	Jonas Cushman.	Mason City	Wm. Nettleton.
Ames	S. B. Mills.	Mapleton	A. Lamb.
Atwood	J. H. Tanner.	Mt. Pleasant	W. S. Wright.
Battle Creek	A. Preston.	Milton	Hon. E. C. Holland.
Boone	L. C. Morris.	Mount Vernon	Robert Smith.
Centerville	Henry Galley.	North English	J. L. Williams.
Charles City	W. B. Towner.	Nevada	Geo. C. White.
Chariton	C. C. Burr.	Olin	Hon. Nathan Potter.
Clarksville	F. M. Russell.	Osage	E. W. Stacy.
Correctionville	Hon. W. B. Chapman.	Orange City	H. J. Vande Waa.
Corning	Jerome Smith.	Paton	A. B. Condit.
Corwith	Wm. Oxley.	Pittsburg	G. C. Duffield.
Clermont	Chas Larrabee.	Rockford	Hon. J. W. Bird.
Council Bluffs	L. Prouty.	Rock Rapids	D. E. F. Merrill.
Creston	M. V. Ashby.	Rockwell City	J. G. Palmer.
Danville	Sherman Matthews.	Rossville	T. B. Wiley.
Emerson	D. B. Nims	Rowley	L. Maxson.
Ely	Hon. A. J. Fuhrmeister.	Ruthven	F. W. Teed.
Fulton	Carl S. Frank.	Sageville	Hon. F. N. Knoll.
Ford	J. C. Richards.	Seymour	L. B. Sager.
Fort Dodge	R. W. Blaine.	Shenandoah	Reuben Mullison.
Geneva	Wm. H. Thompson.	South Amana	John Cownie.
Grinnell	A. C. Price.	Spirit Lake	L. Stowe.
Guthrie Center	W. W. Bailey.	State Center	E. P. Thompson.
Hesper	G. E. Dillingham.	Sumner	John Dawson.
Hodge	James Piper.	Tama	W. G. Malin.
Humeston	Hon. S. H. Moore.	Unity	Edw. Hummer.
Independence	C. L. Thomas.	Van Horne	Spencer Smith.
Jefferson	S. M. Taylor.	Willow Creek	W. S. Nicholson.
Knoxville	G. W. Mendenhall.	Winterset	H. A. Kinsman.
Larrabee	H. H. Carnahan.	Wall Lake	T. E. Wilcox.
Le Mars	Hon. Henry Schrooten.	Wilton	Thos. Boot.
Lawler	Hon. Wm. Glattly.		

METEOROLOGICAL SUMMARY FOR 1897.

The mean barometric pressure for the year was 30.05 inches, with a range for the state of 1.70 inches. The highest observed was 30.90 inches at Clarinda, February 26th, and the lowest was 29.20 inches at Davenport, on March 19th.

The mean temperature of the state for the year, as deduced from the complete records of eighty-one stations, was 46.7°. The station at Malvern recorded the highest temperature for the year, 106°, on July 23d and and September 1st. The lowest temperature recorded was 30° below zero at Rock Rapids and Elkader, on January 25th and 26th.

The average precipitation reported from eighty-four stations was 26.99 inches, which amount is several inches below the normal for Iowa. Winterset reported a total of 36.18 inches for the year. The least amount was 20.21 inches, recorded at Spirit Lake. The average number of days on which rainfall was recorded was 77. There were 158 clear days during the year, 102 cloudy, and 105 partly cloudy.

WEATHER AT DES MOINES, 1897.

COMPARISON WITH PRECEDING YEAR.

The mean temperature in 1897 was 49.6°, against 50.1° for the year preceding. The highest temperature was 98° above, September 1st, against 95° above on July 14, 1896. The lowest temperature was 17° below, January 25th, against 8° below on January 4, 1896. The mean relative humidity was 69 per cent against 70 per cent during the preceding year.

The total precipitation in inches during 1897 was 27.07, against 37.09 in 1896. The deficiency from the average rainfall last year was 6.04 inches, against an excess of 3.93 inches the year before. The greatest precipitation in any twenty-four hours was 2 95 inches against 3.29 inches in the year before. The total depth of snowfall was 49 inches, against 19 7 inches in 1896.

The percentage of sunshine was 59, against 58 in 1896. The average hourly wind movement was 8.10 both years. The prevailing direction in 1897 was southwest, and the year preceding, north. The highest velocity was fifty miles an hour, from the northwest, against forty the year before from the southeast. There were forty-two days during which thunder was heard, against fifty-two in the preceding year.

MONTHLY WEATHER SUMMARIES—1897.

JANUARY.

The mean temperature of the month was 17.2°, which is slightly above the January normal. The weather was unseasonably warm most of the time during the first and second decades; extreme cold prevailed in all parts of the state from the 23d to the 30th, with zero temperature most of time. The mean was at or below zero on the 24th, 25th, 26th and 27th. The lowest temperature reported was 30° below zero at Elkader on the 26th and at Rock Rapids on the 25th; highest reported, 66° at Keokuk and Madrid on the 1st.

The average precipitation for the state was 2.01 inches. Fort Madison reported 6.16 inches and Portsmouth .15 of an inch. There were 12 clear days, 12 cloudy and 7 partly cloudy.

FEBRUARY.

The mean temperature for February for the state was 24.6°, which is above the normal. The average precipitation for the state was .88 of an inch, which is below the normal for the month. There was an unusual prevalence of cloudy and damp weather, the largest excess of cloudiness and humidity being reported in the eastern districts. At the central station the amount of sunshine was 48 per cent; the number of cloudy days 13, clear days 7, and partly cloudy 8.

MARCH.

The mean temperature for the state was 32°, or slightly above the March normal. There was a wide range of temperature recorded, the highest being 72° at Bonaparte on the 19th, and the lowest 22° below zero at Rock Rapids on the 14th. The average monthly range was 67.3° for the state.

The average precipitation was 2.39 inches, which is a little above the normal. Stuart reported 6.16 inches, and the I. A. C. station at Ames only .39 for the month.

There were only 9 clear days, 14 cloudy days, and 8 partly cloudy. The soil at the olcse of the month was generally too wet for farming operations.

OBSERVERS' NOTES.

Bonaparte—B. R. VALE: A very wet, cloudy and disagreeable month. Soil full of water and the prospect for spring work is quite distant.

Fayette—R. Z. LATIMER: Ice went out of the river on the 11th. Frost out in places; roads quite bad. Ground too wet for seeding.

Garden Grove—M. WEMPLE: A nasty month; no farming done Grass beginning to grow.

Grand Meadow—F. L. WILLIAMS: Ground very wet. Frost nearly out. Spring work very backward.

Greene—J. L. COLE: Ice went out of Shell Rock river, doing considerable damage to mill dam and some buildings. On 31st high wind.

Logan—M. B. STERN: The month has been remarkable for cloudy, cold and foggy weather with but little sunshine.

Oskaloosa—JOSEPH BOYD: The month was cloudy and backward. The month closed with the ground full of water.

Ovid—H. C. MILLER: Blue birds and larks arrived the 8th. First frogs peeping 17th. Meadows and pastures getting green.

Primghar—E. S. PROPER: Snow and ice went out all at once with a rush, carrying out several bridges in this county. A backward spring.

Sigourney—E. H. GRIFFIN: There is more moisture in the ground than for a number of years. Farmers report sloughs very wet. Wells that have not furnished water for six years now have an abundance.

West Bend—PHILIP DORWEILER: Latter part of the month snow melting fast and creeks and rivers rising, doing considerable damage to bridges. Farm work commenced the last of the month.

Keokuk—F. GOSEWISCH: Country roads bottomless, and ground so wet that horses cannot work in fields; no spring work done yet. Damage to winter wheat is estimated from 50 to 75 per cent winter-killed.

APRIL.

The month of April was notable for the prevalence of wet, cool and cloudy weather, and excessive rainfall. The mean temperature was 47.9°, which is about the normal for the state. The amount of sunshine was abnormally low in all parts of the state, the records at the central station showing only 47 per cent for the full month.

The average rainfall was 5.35 inches, which amount is 2.75 inches above the April normal. The measurements reported in the central and southern districts were much higher than in the northern belt. The greatest amount reported was 9 86 inches, at Winterset, and the lowest amount, 2.22 inches, at Northwood. As a result of these conditions the farming season was two weeks late at the close of the month.

OBSERVERS' NOTES.

Amana—CONRAD SCHADT: The month was wet, cold and rough and very hard and trying on the farmer. Much plowing and seeding had to be left for May. The killing frost of the 19th and 20th hardly found anything to be killed, as the season is unusually backward.

Atlantic—J. W. LOVE: Severe hailstorm on the evening of the 22d; hail lay on the ground from 2 to 4 inches deep.

Atlantic—GEO. W. FRANKLIN: No damaging frosts yet; plenty of rain. Cellars have water in them. Spring two weeks late. Pastures and meadows good. Clover and winter wheat killed.

Bonaparte—HON B. R. VALE: A cold, cloudy and wet month. But little progress made in agriculture. Seeds in soil germinating badly. The lack of light and heat was very injurious to all young animals.

Logan—MRS. M. B. STERN: The month has been unusually rainy, with a heavy thunderstorn on the 22d. No heavy frosts.

Monticello—HENRY D. SMITH: April, 1897, breaks the record with 5.86 inches rainfall.

Oskaloosa—JOS. BOYD: April was very backward with an unusual amount of rainfall.

Ovid—H. C. MILLER: A cold, wet month, with but few clear days. Hickory and oak buds opened ten days later than last year. Wild plum bloom out last year on the 18th, this year on the 28th. All broken lands flooded on the 23d, 24th and 25th.

Primghar—E. S. PROPER: Season two weeks late. Continued cold weather and rains kept the farmers out of fields. Small grain all sown in this section now.

West Bend—PHIL. DORWEILER: A wet month and farm work very backward. Willow leafing on the 25th, and maple on the 27th.

MAY.

The month was cooler and drier than usual. The mean temperature for the state at large was 59.6°, which is 1.5° below the normal. During the past twenty years there have been nine colder Mays than this, the normal for the state being 60°. At the central station the range for May, in nineteen years, has been 13°, or from the mean of 55° to 68°. The coldest May recorded was in 1888, and the warmest in 1881.

The average precipitation for the month was 1.92 inches, which is 2.26 inches below the normal. The highest amount reported was 3 59 inches at Indianola; least amount, .21 of an inch at Larchwood, Lyon county. The northwest and southeast districts received the least amount of moisture.

OBSERVERS' NOTES.

Belle Plaine—S. P. VANDIKE: Considerable damage to corn and fruit by the heavy frost of the 31st. All tender garden vegetables killed or injured.

Bonaparte—HON. B. R. VALE: A cold, cloudy and dry month, following an excessive wet spring, rendered it adverse to agriculture and the interests of the stockman and breeder.

Cresco—GREGORY MARSHALL: Thirty-first. Killing frost this morning; corn and potatoes killed to the ground; berries badly hurt; damage to apples not yet known. Ice, one-fourth inch.

Estherville—M. L. ARCHER: Thirty-first. Vegetables and corn cut down. Ice formed on standing water.

Fayette—R. Z. LATIMER: The frost on the 30th did a great deal of damage, cutting nearly all early vegetation to the ground, and killing grapes, apples, raspberries, blackberries and early strawberries.

Ft. Madison—MISS L. A. MCCREADY: Small fruit is plentiful, such as cherries, currants and gooseberries. There are few peaches. This has been a very cold, backward month.

Garden Grove—M. WEMPLE: Cold, dry and backward. No oats; everybody replanting corn because of cold and worms.

Grand Meadow—F. L. WILLIAMS: The month has been one of extremes of temperature, with severe frosts at the latter end, doing a great deal of damage to tender vegetation; crop prospects poor.

Larrabee—H. B. STREEVER: May will, in this section, go on record as cold and dry. Frosts on the 24th, 30th and 31st insts. damaged corn and tender garden vegetables somewhat.

Logan—MRS. M. B. STERN: The month has been unusually cold, but no hard frosts. Cold and too dry for tender vegetation. The season is at least two weeks late.

Mt. Ayr—J. W. BEARD: The low temperature of the month has kept the corn back and given the worms a chance to work on it.

New Hampton—C. L. GABRILSON: Corn and potatoes and tender garden truck were frozen to the ground on the morning of the 31st.

Osage—G. D. PATTINGILL: Frost on ten mornings; ice formed to quite a thickness on the morning of the 31st.

Oskaloosa—JOSEPH BOYD: The month was very backward. Crops and garden stuff made slow growth.

Primghar—E. S. PROPER: This has been a remarkably cool month; season over two weeks late, with three killing frosts in last part. Corn is not growing well on account of cold. Small grain doing well; also pasture. Fruit not hurt much yet.

Toledo—CHARLES MASON: Four frosts occurred during the month, the latter one, on the 31st, doing a good deal of damage; 50 per cent of grapes killed; strawberries badly injured; season ten days late.

Waverly—H. S. HOOVER: Plum blossoms first appeared on the 6th. First corn planted the 7th. Freeze on the 31st killed all tender plants generally; a few localities escaped.

West Bend—PHIL DORWEILER: Month dry and cool, and vegetation is backward; light frosts were many, with killing frost on the 31st.

JUNE.

The mean temperature of the month was 69.1°, which is .5° below the June normal. The first decade was unseasonably cool, the second excessively warm, and the third about an average, giving an unusual variety and range of temperature. The maximum recorded was 103° at Sigourney on the 17th; the lowest 29° at Decorah and Lansing on the 1st.

The average rainfall for the state was 3.81 inches, which is .78 of an inch below the normal for June. It was quite unequally distributed, the highest measurement reported being 9.38 inches at Keosauqua, and the lowest 1.03 inches at Rockwell City. The southeastern district received the greatest amount of rainfall, though some excessive measurements are reported from other districts.

There were about the usual number of severe local storms, accompanied by wind squalls, electric force and some hail. At Sioux City, on the 18th, the wind reached the maximum velocity of 72 miles an hour. On that date a windstorm of much force passed through portions of Monroe and Mahaska counties. At Maxon an observer noted a funnel-shaped cloud moving to the northeast at 11:15 A. M., but no serious damage occurred in that vicinity. A similar storm cloud swept through Mahaska county, between Oskaloosa and Rose Hill, causing some damage to buildings, trees and telegraph wires, but no extensive loss resulted. It was probably a violent squall that assumed some of the characteristics of a tornado.

The most extensive and destructive storm of the month occurred on the 23d, accompanied by some hail and lightning, covering a belt of six to ten miles wide reaching two-thirds of the distance across the state, from west to east, through the central and east central districts.

OBSERVERS' NOTES.

Bonaparte—HON. B. R. VALE: There was 5.08 inches of rain in the last nine days as against 1.95 in fifty-eight days previous. A very wet and gloomy close of the month from the farmer's standpoint.

Delaware—WILLIAM BALL: John Maxwell, of Milo township, was killed by lightning on the 23d. Fred Green, of South Fork township, was struck by lightning and fatally burned on the 23d.

Garden Grove—M. WEMPLE: All farm products have made great growth during the last half of the month. Oats light; corn late; meadows much improved. No violent storms.

Grand Meadow—F. L. WILLIAMS: June 4th, at 8 P. M., there was a thunderstorm with vivid lightning and heavy thunder. The morning of the 5th about 5 o'clock there was a long peal of thunder out of a clear sky; the rumbling seemed like an earthquake. Month very warm from the 10th on, and unusually wet.

Grundy Center-GEORGE F. ELLIS: June 19th, at 1 A. M., there were thunderstorms from the southwest with bolts of zigzag lightning very sharp. A large barn owned by J. M. Sprague, of Palermo township, was struck by lightning, killing five head of horses and burning the barn and contents consisting of 120 tons of tame hay, 250 bushels of oats, 2,800 bushels of corn, and crib, and all farm implements. Loss, $2,000.

Humboldt—**Henry S. Wells**: Thunder on the 9th, 10th, 18th and 23d. Some cattle killed by lightning. No other damage. Crops all doing well. Corn will soon recover and be equal to past year.

Iowa Falls—**J. B. Parmelee**: June 4th, light frost; 8th, first ripe strawberries; 22d, oats beginning to head.

Keosauqua—**Prof. J. H. Landes**: Thunderstorms on the 24th. Quite a number of cattle were killed over the country and houses were struck.

Larrabee—**H. B. Strever**: Month opened cool and dry. All crops backward till the middle of the month, after which date growth was stimulated by sufficient heat and moisture and all vegetation bounded forward remarkably.

Logan—**Mrs. M. B. Stern**: The early part of the month was dry and cold, but warm days and frequent showers have helped the growth of all kinds of vegetation. No bad storms.

Marshalltown—**C. M. Cook**: Frost on night of 3d; thunderstorm on 18th at 2 A. M. Rain on the 23d; hail ¾ of an inch in diameter fell.

Mt. Ayr—**A. F. Beard**: On the morning of the 30th we had 1.89 inches of rain from 5 to 6 o'clock.

Oskaloosa—**Jos. Boyd**: There was some very sharp lightning during the month. Houses and trees were struck and some stock killed.

JULY.

The month of July was warmer and drier than usual. The monthly mean for the state, as deduced from 104 station reports, was 75.6°, which is about 1.6° above the normal. The highest temperature reported was 106°, at Malvern, on the 23d, and the lowest was 42°, at Rockwell City, on the 12th. The first decade was an excessively hot period, the mean at numerous points being above 80°.

The average rainfall for the state was 3.26 inches, which is about an inch below the normal for July. The largest amount reported was 7.60 inches, at Stuart; least amount, 1.01 inches, at Osceola. Washington reported the heaviest measurement for a single day, viz: 4.80 inches, which fell on the night of the 23d and morning of the 24th.

For the whole state there were 18 clear days, 10 partly cloudy and 3 cloudy.

OBSERVERS' NOTES.

Alta—**David E. Hadden**: July 3d. Heavy thunderstorm, accompanied by sharp lightning and strong wind from southwest. Large limbs from trees were broken, and some outbuildings near town were blown down.

July 23d. Sharp thunderstorm, with very heavy rain; 1.65 inches water fell in 1 hour and 10 minutes.

July 1st. Heavy fog in early morning.

July 31st. Aurora, first noticed at 9:30 P. M., when it had dark segment and active streamers. From 9:40 to 11 P. M. it was quiescent. At 11 P. M. waving curtains of parallel bars moved rapidly from east to west, at an altitude of 35° to 40°.

Bonaparte—**Hon. B. R. Vale**: A very warm and close month; killing many work horses and some swine in feeding. The storm of the 23d did some damage to crops.

Chariton—HON. S. H. MALLORY: Terrific electric storm midnight of 24th, of about one hour duration.

Garden Grove—M. WEMPLE: The month has been an all-round good month. No storms, plenty of moisture to the present. Hay and grain all secured.

Keosauqua—PROF. J. H. LANDES: On the night of the 23d there was a severe windstorm accompanied by heavy thunder and fierce lightning. Many objects were struck by lightning and some damage resulted from wind.

Larrabee—H. B. STREVER: July weather conditions have been rather unfavorable for the ripening of small grain, but corn has pushed forward wonderfully. A severe hailstorm visited the territory west of Cherokee on the evening of the 29th.

Ovid—H. C. MILLER: A severe electric storm on the afternoon of the 24th. One man killed near Humeston. A barn destroyed in Clay township and one in Corydon. Most of the telephone fuses burned out at Corydon and Seymour; several persons badly shocked and some stock killed.

Plover—J. S. SMITH: Very heavy wind morning of the 31st; blew grain in shock badly.

Sidney—G. V. SWEARINGEN: Duststorm 31st and high wind all day with warm gusts, which wilted all vegetation greatly.

Thurman—A. R. PAUL: Hot wind in P. M. of 31st.

Washta—H. L. FELTER: A very heavy wind on the night of the 29th that did some damage to crops. Considerable lightning but no rain in this neighborhood, but in some parts of the county a little hail fell.

Waukee—N. C. WRAGG: Bad storm on night of 23d; lightning and wind did some damage.

AUGUST.

The month was cooler and drier than usual. The mean temperature was 63.9°, as shown by 107 station reports. That is 2.4° below the norma for August. Light frosts occurred on several dates, and on the 29th the temperature was low enough to kill corn on low ground in numerous localities in the northern districts. The lowest temperature reported was 35°, at Mason City on the 29th; and in that vicinity the effects of frost were most observed.

The average rainfall was 1.86 inches, which is 1.39 below normal. The distribution was quite unequal, the range being from .47 of an inch near Ames to 4.98 at Logan. There were 15 clear days, 5 cloudy and 11 partly cloudy.

The most destructive storm of the month occurred on the evening of the 20th, sweeping over extensive portions of Plymouth and Woodbury counties. The damage was chiefly caused by hail of unusual size and quantity. The extent of territory swept by the storm has been variously estimated at from 100 to 200 square miles, wherein the damage was very heavy. Corn and fruit suffered most, and were partly covered by insurance.

OBSERVERS' NOTES.

Alta—DAVID E. HADDEN: Hail damaged corn to some extent on August 7th in eastern part of county.

Amana—C. SCHADT: The drouth continued to the end of the month. The soil is so dry that no plowing is possible. Crops are suffering from its effects.

Belknap—A. W. RANKIN: Heavy hail on the 3d did great damage.

Bonaparte—HON. B. R. VALE: A cool, dry month. Slight frost on the 25th. Corn matured slowly. But little fall work done.

Britt—GEO. P. HARDWICK: On the 7th, at 5:30 P. M., a severe storm from the northwest assumed cyclonic proportions accompanied by rain, 2.21 inches, including hail which, in places, formed into drifts, parts of which remained twenty-four hours. The storm continued in a southeasterly course, widening to several miles. Buildings were blown down, crops on some farms totally destroyed or made unfit for harvest. One young man and some stock killed near Klemme.

Cresco—G. MARSHALL: Light frosts on the 20th and 30th; no harm to vegetation.

Forest City—J. A. PETERS: On the afternoon of the 7th a severe hail and windstorm passed over a portion of the northern half of the county (Eden township), all crops being destroyed in its path, which was from a half to one mile in length. Mean temperature for the month has been about 6° below normal.

Grand Meadow—F. L. WILLIAMS: The month has been cool and very dry. Pastures are suffering for rain. Corn very late; needs three weeks to ripen.

Humboldt—HENRY S. WELLS: In two weeks the great bulk of the corn crop will be safe from frost. Some rain will help fall plowing. This year is rounding up better than for several years. No frost so far.

Logan—M. B. STERN: A damaging hail passed over a small part of the county on the 20th. Did not cover a large area, but cut corn and gardens quite badly where it passed.

Monticello—A. MATTHIESSEN: Very heavy dews; very severe lightning on the night of the 24th.

Newton—A. LUFKIN: Rainfall for first eight months of 1896, 36.03; for 1897, 21.51; excess of 1896 over 1897, 14.96 inches.

Ovid—H. C. MILLER: Hot winds on the 1st, 2d and 13th; light frosts on the 20th and 30th, but only on low ground and no damage was done.

Sidney—G. V. SWEARINGEN: Thunderstorms on the 13th, 17th and 24th. One house in town struck—damage nominal. Duststorms on the 28th and 31st. Too much dry weather.

Toledo—CHARLES MASON: The small amount of rainfall in the pas summer months is telling on the corn crop at this time; also all other falt crops are in great need of rain, roads are very dusty, pastures have ceased to grow and are about all eaten up, and stock will have to be fed from winter stores unless good rains come soon.

Washta—H. L. FELTER: A good many cold nights during the month; the ground too dry for fall plowing.

West Bend—PHIL. DORWEILER: Month cool and dry, and not favorable for corn; no frost during the month, but close to it on several nights.

SEPTEMBER.

September, 1897, will long be remembered as a month of excessively high temperature; the average for the month as obtained from 105 reports was 70.9°, which is 8.7° above the normal. The temperature was especially high during the first ten days of the month; the maximum during those days ranged from 90 to 100° or over in the larger portion of the state, accompanied by brisk and dry winds, prematurely drying up the corn and pastures. The coolest part of the month, and in fact the only cool part of the month, was between the 16th and 21st. Light frosts occurred in the northern half of the state on the 17th, and general frosts on the 20th, being heavy to killing in the northern portion, and light to heavy in the southern portion. During the last eight days of the month the temperature was again high. There was an average of fifteen days during the month on which the temperature was 90° or above.

The average rainfall was 2.04 inches, or 1.40 inches below the September normal. Showers were quite general on the 1st and 2d, and in many localities they were heavy. Light and scattering showers occurred in the northern portion of the state on the 4th and 5th. Well distributed showers occurred on the 14th and 15th, with general rains on the 16th, which gave temporary relief to pastures, but as no rain fell in any part of the state after the 16th pastures were again dry before the close of the month, and corn was being picked and cribbed. The soil is too dry to plow and what fall grain has been sown is suffering for want of moisture.

OBSERVERS' NOTES.

Afton—N. W. ROWELL: Frost on the 20th on low lands.

Algona—C. D. PETTIBONE: First frost of the season on the 17th No damage.

Alta—PROF. DAVID E. HADDEN: First killing frost in low places on the 17th; more severe on the 20th. A very dry, hot and dusty month. Pastures suffering for rain. Scarcity of water in localities.

Amana—CONRAD SCHADT: The month was extraordinarily warm and sunny. With exception of a few rainy days the sky was almost cloudless throughout the month. It closed with a severe drouth which commenced about the middle of the month.

Belknap—A. W. RANKIN: This has been a wonderfully dry month, and hot, with scarcely a cloud. The great hail of August 3d well nigh ruined corn, fruit and other crops, only to be completed by the hot, dry weather since, and rounding up with the frost of the 20th and 21st. But at many places in the county crops have been good.

Bonaparte—HON. B. R. VALE: An extremely dry and hot month. Corn light and immature. But little seeding done.

Britt—GEORGE P. HARDWICK. Exceptionally dry and clear; mild winds.

Charles City—HENRY C. ANDRESEN. September 1st, a very hard rain and wind, beginning 12:17 A. M., having three successive showers, rain coming in torrents, ending 5:30 A. M.; sharp lightning and thunder.

Delaware—WILLIAM BALL: The thunderstorms of the 10th and 16th did considerable damage. Lightning struck and burned two stores and contents in the town of Delhi on the 10th, and on the 16th burned a large barn and contents near Delhi, besides killing several head of stock in other parts of the county.

Forest City—J. A. PETERS: Killing frosts have occurred as follows since the establishment of a station here: 1894, first killing frost 18th; 1895, 30th; 1896, 20th; 1897, 20th. Mean temperature has been 7° above the normal. There have been no storms. More sunshine than in any month of the year.

Ft. Madison—MISS L. A. MCCREADY: We are having a very dry spell of weather; wells and cisterns are giving out and everything is drying up. Corn leaves are so dry you can rub them to powder.

Grand Meadow—F. L. WILLIAMS: The rain of the 1st was next to the heaviest ever measured at this station. The month as a whole was extremely warm, with an unusual amount of sunshine.

Grundy Center—GEORGE F. ELLIS: On September 1st, at 9 A. M., a thunder shower passed six miles northeast of this station. Lightning struck the German Reform church in Lincoln township, burning the building and contents. Several head of cattle were also killed by the same storm.

Humboldt—HENRY S. WELLS: The plowing is greatly retarded by the dry weather. Much of the corn is ready to crib. Hog cholera is bad. Feeding now is the rule.

Lamoni—ORRIN DUDLEY: Dry weather. Potatoes and corn suffered for want of rain.

Logan—MRS. M. B. STERN: The month has been remakable for the heat and dryness. For twenty days the mercury has been 90° and upward — an unprecedented record.

Monticello—A. MATTHIESSEN: Severe lightning on the night of the 15th. Nights very cool. Frost on some nights, but not severe enough to hurt much. A very dry month.

Oskaloosa—JOSEPH BOYD: September was a very warm and dry month, with only one cloudy day.

Ovid—H. C. MILLER: Hottest and driest September ever known here; ponds and wells failing; stock water very scarce. This locality is overrun with rats.

Sidney—G. V. SWEARINGEN: Thunderstorms from the 10th to the 14th were moderate and no harm done. Wind and duststorms of more or less force from the 1st to the 9th. The hottest September ever known here.

Toledo—CHARLES MASON: This is the most remarkable month in all my observations for the past twenty-five years for extreme heat and cloudless days, and absence of winds, also smothering clouds of dust. Water is getting very low and a greater scarcity will be felt unless we have heavy rains before the ground freezes.

Garden Grove—M. WEMPLE: A bad month. Everything dried up. No grass; no water; no anything but heat and dust.

Waterloo—M. L. NEWTON: Mean temperature for the month, 70°, which is 6.8° above the normal as obtained from fifteen years' record. The total rainfall for month, 2.77 inches, which is 2.40 inches below normal] as obtained from fourteen years' record.

OCTOBER.

The month of October was unusually warm and dry. The mean temperature for the state was 56.8°, which is 6.8° above the normal. The highest temperature recorded was 97° at Ottumwa, on the 1st; and at numerous places the records showed maximums above 90° during the first half of the month. The lowest temperature reported was 20° at Plover, on the 29th. There was a prevalence of southerly winds. There were 17 clear, 8 partly cloudy and 6 cloudy days. The average rainfall for the state, as shown by reports from 108 stations, was 1.14 inches—1 64 inches below the normal for October. The bulk of the rain fell between the 10th and the 19th, the balance of the month being almost wholly rainless. The southwest district reports the heaviest rainfall, the amount at Thurman, Fremont county, being 3.30 inches.

It was an ideal month for drying out corn and for securing all outstanding| crops in the best condition. Corn was in condition for cribbing ten days earlier than usual, and the work of husking was well advanced at the close of the month. It was dried out perfectly, and though much of it was permaturely ripened, yet it was all sound, and not a bushel of soft corn was cribbed. The condition of the crop is much better than was anticipated, and a larger percentage will be merchantable than was deemed possible a month earlier in the season.

OBSERVERS' NOTES.

Amana—CONRAD SCHADT: The drouth of September continued till the 11th, when .40 inch fell, with a little sprinkle of .04 on the 16th, and .38 rainfall on the 19th. From this date no rain fell till the close of the month. Nearly all trees kept their green foliage, and tomatoes and very tender flowers, such as Madeira vines, etc., continued to flower and grow until the first killing frost at the end of the month put a stop to the growth of plants.

Bonaparte—HON. B. R. VALE: Only 1.33 inches rain since August 3d, and that in six showers. No plowing for corn, and the little seeding has perished. Roads deep with dust. Pastures dried up, and stock water a great object.

Cresco—GREGORY MARSHALL: Warmest October on record, except 1879.

Forest City—J. A. PETERS: The weather has been very dry; many wells are giving out. Pastures have afforded very little feed.

Fort Madison—MISS L. A. MCCREADY: We have not had a good rain since the 3d of last August. Everything is drying up. Farmers say the winter wheat is burned up. Water is very scarce; some have to haul water for use.

Grand Meadow—F. L. WILLIAMS: The month has been extremely warm and dry. Corn is as dry as it usually is in January. Pastures got rather short. Plowing and husking well along. Great crop of clover seed is being hulled.

Greenfield—J. G. CULVER: Twenty-seventh, sweet peas and tea roses blooming yet, although most of the leaves of the trees have fallen. Twenty-eighth, first ice formed.

Humboldt—HENRY S. WELLS: A good month for all farm work except plowing; but the plowing is well along. Wheat averages 15 bushels, oats 35, corn 30, and flax 12.

Iowa City—MRS. C. M. HOBBY: Everything very dry. Cisterns and wells empty. Referring to the record for the months of October and

November for the year 1891, there is very little encouragement to hope for rain. With the exception of the year 1895, there have been almost no rainy days, and very few with snow, in the month of November, from 1891 to 1897.

Lamoni—O. DUDLEY: No damage done by frosts. Continued drouth bad on wheat.

Larrabee—H. B. STREVER: Extreme drouth prevailed until the 15th inst.

Lenox—J. L. HURLEY: First ice formed on the 19th, second on the 29th.

Osceola—A. W. LEWIS: Tomato vines growing and in full bloom up to 29th.

Oskaloosa—JOSEPH BOYD: The month of October was deficient in rainfall, but was very favorable for maturing the corn crop.

Ovid—H. C. MILLER: Frost on the 22d did no damage except on low ground. Garden truck all green until the freeze on the 29th. First wild geese seen on the 8th.

NOVEMBER.

The month was slightly warmer and drier than usual. The mean temperature for the state was 34.3°, which is 7° above the normal. There was an average monthly range of over 77°. The highest temperature reported was 81°, at Iowa City and Albia, on the 20th, and the lowest was 19° below zero at Rock Rapids, on the 28th.

The average precipitation for the state was .66 of an inch. Fort Madison reported 2.24 inches, which was the largest amount recorded. Atlantic and Glenwood reported only a trace during the month. There were but 10 cloudy days, 8 partly cloudy and 12 clear. It was, on the whole, a fair and mild November, with less than usual severe storms. The maximum wind velocity was forty-five miles per hour, at Sioux City on the 10th. The general wind movement was below the November normal.

OBSERVERS' NOTES.

Belknap—A. W. RANKIN: Very dry fall; little or no rain since August 3d. November closes with ground frozen hard and but little stock water, and no snow save a very little on the 15th.

Bonaparte—HON. B. R. VALE: A very dry and cool month; excellent for corn harvesting and for hauling. No plowing. Water in ponds and creeks exhausted and wells low.

Chariton—S. H. MALLORY: Stock water very scarce. Temperature 4° higher than in 1896.

Ft. Madison—MISS L. A. MCCREADY: First snow night of 15th. The ground is very hard and dry. We need more rain very badly.

Grand Meadow—F. L. WILLIAMS: The month was marked by extremes of temperature; a range of 74° in the first ten days. Ground frozen up very dry.

Humboldt—HENRY S. WELLS: A wonderful dry month; only four inches of snow; two inches coming the 26th and two the 28th. No prevailing sickness. Stock in healthy condition.

Lamoni—ORIN DUDLEY: Corn husking practically completed. Lack of water is the general complaint.

Larrabee—H. B. STREVER: Weather unseasonably mild during first two decades of month. Plowing the order of the day during second decade. Mild weather has enabled farmers to plow nearly the average acreage. The plow stopped by frost on the 21st.

Sidney—G. V. SWEARINGEN: First killing frost of the season occurred on the 1st. Freezing on the 10th. First snow of the season the 15th. A drop in temperature of 43° in about ten hours on night of 20th.

Sigourney—E. H. GRIFFIN: Ground has frozen up very dry. Wells are generally low, and the problem of water for stock is serious. Roads are in excellent condition.

Washta—H. L. FELTER: Extreme cold weather the last five days of the month; in one instance 12° below zero.

Waterloo—M. L. NEWTON: First snow of the season the 12th. Dense fog with lightning on the 14th.

West Bend—PHILIP DORWEILER. A fine month. Stock looks well and roads are good; some sleighing since the 28th, but it did not last.

DECEMBER.

The month of December was colder than usual, and there was more than the normal amount of snowfall. The mean temperature of the state, as shown by records of 108 stations, was 10°, which is 5° below the normal. The warmest day was the 9th, on which date the records showed 60° at Denison and Mt. Pleasant. The lowest temperature was 25° below zero at Atlantic on the 18th.

The average precipitation for the state was 1.65 inches, which is .34 of an inch above the December normal in Iowa. It was mainly in the form of snow, which was generally well distributed. The surface was covered with snow more than usual, especially in the northern part of the state. It was a fine, bracing, healthful winter month.

OBSERVERS' NOTES.

Bonaparte—HON. B. R. VALE: A solid but pleasant month; good roads: good for feeding and healthy for man and beast.

Britt—GEORGE P. HARDWICK: Slight blizzard on 5th. Damp, frosty air 8th to 13th. Hard wind 5th, 15th, 24th, 28th and 31st. Unusually good sleighing throughout the month.

Carroll—MOSES SIMON: Finest sleighing for years.

Clarinda—A. S. VANSANDT: On the morning of the 29th the wind was in the northwest, soon veering to west. It was mild as May and reminded me of what I have read of the chinook. Query: Was it the tail end of one? The snow, which was very compact from previous melting, lost one-third of its depth.

Forest City—J. A. PETERS: More snow has fallen during this month than in any month since the establishment of this station.

Grand Meadow—F. L. WILLIAMS: The month has averaged very cold only four days above freezing. Sleighing was very fine. Stock doing well. prices for hogs, fair.

Iowa Falls—J. B. PARMELEE: Fair sleighing from the 3d to the 20th, and the best of sleighing from the 20th to the 29th.

Larrabee—H. C. STREVER: Heavy snowfall, excellent sleighing, and absence of snow drifts were chief features of December weather. Good sleighing from the 3d inst. to close of month. Very little frost in ground.

Lenox—J. L. HURLEY: Fog of 10th and 12th formed a heavy spear frost on trees and fences, spears being from one inch to one and one-quarter inches long. First ice cut on the 21st and 22d. Nine inches thick and good quality.

Logan—MRS. M. B. STERN: The month has been cloudy and cold, but the snow has fallen quietly, without much wind, and so is distributed evenly over the dry ground.

Monticello—A. MATTHIESSEN: Very heavy snowstorm on the night of the 4th. Severe thunderstorm on the night of the 10th.

Odebolt—E. STARNER: December 4th, chinook at midnight that settled the snow about six inches.

Sidney—G. V. SWEARINGEN: The month has been cold. All trees, shrubs, leaves, etc., were beautifully covered with ice and frost from the 9th to the 12th, and from the 19th to the 22d.

Sigourney—E. H. GRIFFIN: On the 10th the rain was accompanied by sharp lightning and loud thunder in the east. It was a characteristic thunderstorm.

Toledo—CHAS MASON: The best sleighing for years. Ground froze up very dry. The snow will not leave much water when melted.

Thurman—C. R. PAUL: A norther broke over this section of Iowa at 2:15 P. M., December 15, 1897. Strong wind accompanied by snow flurries and a rapid fall in temperature of 36° in six hours.

Washta—H. L. FELTER: On the 15th the thermometer fell from 30° above zero to 5° below in two and a half hours.

A NOTABLE HAILSTORM.

A Washington county local paper gives some details of the destructive hailstorm that passed through that section September 1, 1897. It says:

> On Friday we drove out into Highland township to see the track of destruction left by Wednesday's hailstorm. One could scarcely credit the reports that were current in regard to the damage done by it; but a drive through Highland township will soon convince the most skeptical that these reports are not exaggerated. We had no idea that anything short of a cyclone could do such fearful havoc in so brief a period.
>
> Imagine, if you can, a tract of country at least sixty miles long and averaging two to three miles wide in which scarcely a stalk of corn is left standing and the crop is as complete and total a loss as if it had been cut with a corn harvester and stolen bodily from the owners Imagine, if you can, a strip three to four miles wide on each side of this first strip in which, on an average, half the corn crop has been destroyed; put on top of this the wreckage of hundreds of windmills, the destruction of all the glass in the north windows of hundreds and hundreds of houses, the loss of thousands of chickens and turkeys, the wreckage of orchards, vineyards and gardens, the damage to barns, sheds, cribs, etc., and one will have a faint idea of the scene that meets the eye in the wake of the hailstorm.
>
> At least 40,000 acres of corn have been totally destroyed, while 70,000 acres have been so pounded and wrecked by hail that half or more of the crop is a total loss. The

actual loss to the farmers in Washington and adjoining counties exceeds half a million dollars, and may pass the million mark.

Many farmers had shelled and hauled off their corn since the recent advance in the price, and by November 1st will not have a bushel of corn or a peck of apples to show for their season's work.

Driving northeast on the Riverside road, the damage became quite noticeable at Lyman Babcock's farm, and increased as we drove northeast and east. At the Foster farm less than a third of the corn was left standing, and two or three miles farther on it was scarcely possible to find a stalk standing in a forty-acre field. The stubs of the stalks stand, on an average, about two or two and one-half feet high, but the balance of stalks, ears, blades, etc., have been pounded off and are rotting on the ground Wherever you find a willow hedge, the road is carpeted with leaves and twigs, and at a little distance the trees show just a shade of green and look as if they were just beginning to leaf out in the spring.

The storm seems to have originated in Iowa county, not far from Marengo, sweeping southeast through Iowa, a corner of Johnson, crossing the northeast corner of Washington and expending the remainder of its fury in Louisa county. It passed north of Wellman, but struck Kalona with full force, playing sad havoc with plate glass windows. The eastern edge just touched Riverside, the damage there being slight except by lightning. The St. Mary's parochial school building was struck and burned and is a total loss. The storm narrowed somewhat as it went south, and passed between Ainsworth and Ootter.

At W. R. Jeffrey's farm, in Highland township, the storm became almost a cyclone and wrecked his fine new barn, 52x35 feet. Howard Jeffrey was in the barn at the time and had a close call. When the west end went out of the barn he tried to get into the basement, but failed, and just then was struck in the forehead with a hailstone and knocked senseless. Possibly this saved his life, for had he succeeded in getting into the basement he would have been crushed under the north wall, which was blown in bodily. This wall was two feet thick, seven and one-half feet high, fifty-two feet long and only three or four feet of it above ground.

WEATHER AT CLINTON, 1897.

ANNUAL REVIEW BY DR. LUKE ROBERTS.

The following is the summary of the meteorological conditions which prevailed at Clinton for the year 1897.

The first five days of the year were cloudy and dark, with rain and mild temperature, but on the 6th the temperature dropped to 2° above zero. The fearful blizzard which had just traversed the Dakotas and Minnesota did not disturb eastern Iowa. From January 25th to the 29th the temperature was low, reaching 21° below zero on the 25th, with a clear sky and moderate wind. During this cold period a very severe blizzard was raging in Michigan. This cold wave extended southward to the gulf states. The average temperature of the month was above normal and the precipitation somewhat in excess with a snowfall of 7 inches.

February was colder than the average, and excessively cloudy with only 3 clear days.

The amount of precipitation was less than an average. Snowfall was 11 inches, but little valuable sleighing resulting.

This being the close of the winter months, the following departures from normal may be noted: Number of storm days, 4 less; depth of snowfall, 4 inches less; precipitation, rain and melted snow, .47 inches more; mean temperature, 3.2° more.

March gave a temperature much above normal; her winds were kindly tempered, but her rainfall came in excess. On the 19th 1.34 inches fell, and on the 23d occurred a notable storm of snow to the depth of 11 inches, which represented 1.36 inches of water. This snow did not remain long; being quite damp it clung tenaciously to every limb and twig, arching them beneath the accumulated weight. In the sunlight they resembled boros of crystals.

On the 21st the Mississippi river cleared of ice and a steamboat passed up At the close of the month streams and wells were fully up to a normal condition for the season.

April was characterized by changeable temperature, but the mean was about normal.

The rainfall was .64 inches below normal, and yet from excess of wetness plowing and seeding had been retarded 10 days.

The river was at its season's height on the 18th, being 16.8 feet above low water.

May was largely deficient in rainfall, and, withal, rather cold. There were three frosts, the last one on the 31st, doing serious damage to potatoes, beans, tomatoes, strawberries, and early raspberries. Other fruits and vegetables, such as grapes and corn, were less injured.

The outlook at the close of the month was not very encouraging to farmers. Subsequent conditions proved their fears well founded, for the crops did not regain what was lost in the start.

June was more favorable for all kinds of crops, giving a normal temperature and a liberal amount of rain, but not up to the June standard. The deficiency of rain for the last three months, ending on June 30th, was 4.96 inches. A light frost appeared on the 7th.

From the 10th to the 19th, and the last three days of the month, it was very warm. An electrical storm on the 18th did damage to stock and buildings in the townships about. On the 30th a downpour of rain flooded a portion of Elk River township, overflowing the banks of the south fork of Elk river, inundating corn fields and grass.

July continued the hot days up to the 10th, beating the record for high temperature for so great a number of successive days.

Notwithstanding the excessive heat of July and the deficiency in rainfall, the crops thrived wonderfully. Matured crops, including hay, never gathered in finer condition. At the close of the month all growing crops and pastures were much in need of rain. Streams were low, except the Mississippi river, which was at a good stage of water up to the close of the month. But at the close of the following month the supply had been so diminished as to bring the water level down to 42 inches above low water mark. The August rainfall was a mere pittance, and the unharvested crops, pastures, trees and shrubs were seriously injured by the drouth and scorching rays of the sun. The first and last portions of the month were warm, and the central cool.

Except a copious rain on the 1st, September was no improvement over August. From the 2d to the 15th the temperature was high, and the number of clear days during the month was in excess of former records.

For the six months ended on the 30th day of September, only 11.25 inches of rain fell; being 10:49 below normal.

During the same period the mean temperature was 65.1°, while in 1881, with a temperature of 65.7°, there was a rainfall of 19.94 inches. The per cent of sunshine for the six months (1897) was 60, being 1 per cent above normal.

Notwithstanding the character of the weather for the season as narrated above, and the wetness and coolness of the soil at the time when early plowing and seeding is expected to be done, and the further fact that much of the early planted corn failed to come up, which necessitated replanting, the soil of Iowa made a record not to be ashamed of, in the yield of her varied grains and fruits for the year 1897.

The drouth continued to the close of October, with a large per cent of sunshine and high temperature, with less rainfall than in any former October, leaving pastures barren, and rendering plowing difficult.

During November the temperature kept above normal, and there was no excess of rain.

The only gratifying feature of the last two months was their fitness for all kinds of out-of-door work. The farmers appreciated this, and garnered their crops while the sun shone. The fine weather added to the quality of the corn crop.

December was colder than the average and deficient in rainfall, thus closing the year with less rainfall than any during the last nineteen preceding years. Total precipitation for the year was 23.63 inches, or 10.91 inches less than an average for the nineteen years. The lowest previous record was 27.57 inches, occurring in 1894.

The precipitation for the last ten years was less than the preceding nine years by 17.37 inches.

The dwellers in Iowa ought to be proud of her climate and soil when remunerative crops can be raised with a minimum amount of rainfall.

CONSPECTUS.

Highest temperature, 100°, June 14th and 17th.
Lowest temperature, 21° below zero, January 25th.
Extreme range of temperature, 121°.
Mean daily temperature, 48.7°.
Mean daily range of temperature, 21°.
Greatest mean monthly range of temperature, 25.6°, October.
Least mean monthly range of temperature, 13.6°, February.
Greatest daily range of temperature, 47°, October 1st.
Least daily range of temperature, 5°, April 5th.
Warmest month, July; mean temperature, 76.1°.
Coldest month, January; 19.6°.
Warmest day, 87°, July 3d.
Coldest day, 14.7° below zero, January 25th.

Total number of days with the maximum temperature of 90° or above, 41; 9 in June, 18 in July, 6 in August and 8 in September. The last three days of June and the first ten days of July were consecutively over 89°.

Total number of days with the maximum temperature 32° or below, 50; 17 in January, 7 in February, 3 in March, 5 in November, and 18 in December.

Total number of days with the minimum temperature at or below 32°, 135.

CLOUDS.

Mean daily cloudiness, 46 per cent of the surface of the sky.
Month with the greatest per cent of cloudiness, February, 71 per cent.
Month with the least per cent of cloudiness, September, 20 per cent.
Total number of clear days, 143.
Total number of cloudy days, 118.
Month with the greatest number of clear days, September, 23.
Month with the least number of clear days, February, 3.
Month with the greatest number of cloudy days, April, 19.
Month with the least number of cloudy days, July, 2.

PRECIPITATION.

Total depth of snowfall, 38 inches.
Greatest fall of snow at any one storm, 11 inches, March 23d.
Total precipitation (snow being melted), 23.63 inches.
Greatest rainfall at any one storm, 2.02 inches, June 23d.
Month with the greatest precipitation, March, 3.72 inches.
Month with the least precipitation, October, .27 inches.
Month with the greatest number of storm days, January, 12.
Month with the least number of storm days, October, 3.
Total number of storm days, 100.
The average rainfall per week was about .45 of an inch.

THE WIND.

Total movement of the wind, 42,290 miles.
Maximum velocity per hour, 32 miles.
Greatest monthly movement, 5,540 miles, March.
Least monthly movement, 1,600 miles, September.
Prevailing direction of the wind was from the west.

Observation taken at 7 A. M., 2 P. M. and 9 P. M. show the movement of the wind to have been 111 times from the north, 124 times from the northeast, 120 times from the east, 119 times from the southeast, 144 times from the south, 208 times from the west, 150 times from the northwest, and 119 times from the southwest.

Maximum velocity for January, 32 miles an hour; for February, 20 miles; for March, 26 miles; for April, 27 miles; for May, 20 miles; for June, 13 miles; for July, 32 miles; for August, 14 miles; for September, 12 miles; for October, 13 miles; for November, 23 miles; for December, 24 miles.

SNOW AND FROST.

The last spring snow fell on the 10th of April.

The first snow in autumn came on the 28th of November; depth, three-fourths of an inch.

Last killing frost in the spring, May 31st. It did much damage.

On the 20th of August a very light frost was seen in some low places, but the first damaging frost occurred on 21st of September.

Number of consecutive days without damaging frost, 113. This is the least number of consecutive days without damaging frost in 19 years, save that of 1883, which gave only 109. This was the year that corn was not permitted to mature on account of early frost. The season for growing crops was short and abnormally cool. The mean temperature for that year was 3° below normal.

The temperature of the air was at the freezing point for the last time in the spring, on the 20th day of April. The first in autumn, 29th day of October.

The last day in the spring when the mean temperature was below 32°, was March 27th, and the first in autumn was November 11th.

Electro Meteors.—Number of auroras observed, none. Number of days with thunner and lightning, 22. None in February, October and December.

Optical Meteors.—Number of solar haloes observed, 4; number of lunar haloes observed, 5; meteors, 1.

SIOUX CITY WEATHER RECORDS FOR 1897.

BY OBSERVER U. G. PURSSELL.

The weather in Sioux City for the year just passed, with the exception of the frequent winds, was of a rather commonplace order. There were hot days and cold days, and the rain fell and the snow dropped, but there was practically nothing extravagant or remarkable in their accomplishments. It might be said that 1897 was just an ordinary sort of a year as far as the weather was concerned, keeping well up with the average and not exerting itself to do anything to be wondered at, except that it blew itself a little bit more than its predecessors.

The hottest day of the year was July 31st, when the mercury stood on its tiptoes and peaked over the 102 mark. The hottest day Sioux City has seen since the weather bureau was established was July 24, 1896, when the mercury reached 107°. The coldest day of 1897 was January 25th, when the thermometer registered 18° below zero. The coldest day on record at the local weather office is January 19, 1892, when the temperature was down to 28° below zero. The mean annual temperature for 1897 was 46.8°. There were thirty-five days in the year when the mean temperature was below 14°; 110 days when it was below freezing point, 32°; 100 days when it was above 68°; thirty-four days when it was above 77°; not one when it was above 90°.

The total rainfall for the year was 20.38 inches, which is unusually light. The heaviest annual rainfall in Sioux City on record is 33.29 inches, in 1891. The heaviest monthly rainfall in 1897 was 4.03 inches, in April. The heaviest monthly rainfall on record is that of May, 1896, 6.39 inches. The lightest monthly rainfall in 1897 was .43 of an inch, in February. The lightest monthly rainfall on record was .02 of an inch, in December. 1895. The heaviest fall during any twenty-four hours in 1897 was 1.72 inches, on July

19th-20th. The total snowfall during the year was 47.9 inches. The heaviest monthly snowfall was in December, 26.4 inches

The 109,603 miles of wind was the only redeeming feature of 1897 in the way of sensations. Previous to this year 1894 held the record, with 102,069 miles. The largest monthly movement of the wind during 1897 was in April, 11,465 miles The prevailing direction of the wind was from the northwest. The average hourly wind movement was 12.5 miles The highest wind velocity was reached on June 18th, when the wind blew at the rate of 72 miles an hour. On only two occasions since the station has been established here has the wind reached a greater velocity, 84 miles on May 21, 1893, and 75 miles on June 20, 1894. On 24 days during the year did the wind blow a gale, that is, at a velocity of 40 miles an hour or more.

There were 99 rainy days during 1897; on 29 days it snowed; on 3 days it hailed; there were 15 foggy days; on 27 different days there were thunderstorms; there were no auroras borealis. There were 150 clear days, 78 partly cloudy days and 137 cloudy days. The average humidity of the air during the year was 82 per cent. The mean pressure of the air at 8 A. M., only one observation a day of the barometrical figures being taken, was 28.82; the highest pressure noted was 29.49, on February 26th; the lowest pressure noted was 28.14, on March 19th.

IOWA'S SOIL PRODUCTS.

REVIEW OF THE CROP SEASON.

The crop season of 1897 opened unusually late, the necessary work of preparation for seeding and planting being begun ten days to two weeks later than in the average of recent years. The month of April was excessively wet, and the amount of sunshine was abnormally low. The soil was generally saturated with moisture, rendering field word difficult, and, as a result, plowing and seeding were greatly delayed or were performed under unfavorable conditions for the best results. May was cool and dry, and this caused the formation of clods and crusts on the surface of fields that had been worked during the wet period in April. Planting was done under unusual difficulties, and on account of the poor condition of the soil, cool weather, and defective seed, the stand of corn was much below the average. On the first of June the average condition of that crop was rated at 79 per cent, and the stand about 75 per cent. The crop correspondents of this service rated the other staple crops as follows: Winter wheat, 67 per cent; spring wheat, 91; oats, 88; barley, 86; rye, 90; flax, 89; timothy, 97; clover, 95; millet, 93; potatoes, 92; apples, 90; grapes, 85; strawberries, 96; meadows, 97; pastures, 99

JUNE.

As a whole the month of June was favorable to crop advancement, though some unseasonable weather prevailed during the first decade. The frost and freezing temperature on the last day of May caused but little permanent injury to field crops, but grapes and vegetables were badly hurt in exposed localities in the northern and central districts.

The first week in the month was colder than usual, and the rainfall was generally deficient. The cool weather continued until about the middle of the second week, followed by higher temperature, which brought up the average to about the normal. The dry weather throughout the first half of the month was favorable to replanting corn, which was necessitated by defective seed and the ravages of cut worms. Much more than the usual amount of replanting was done, and still the stand was far below the average of former seasons.

The third week brought seven abnormally warm days, the daily mean temperature ranging from 6° to 7° above the normal.

The rainfall was sufficient for the growing crops in the larger part of the state. Corn, wheat, oats, barley and flax made rapid advancement under the improved weather conditions.

The last week of the month was slightly cooler than usual, with copious showers throughout the larger part of the state. It was highly favorable for grass, potatoes, wheat, oats, barley and flax, and corn made some progress except where the soil had not been in condition to be cultivated. Haying operations were retarded by showery and cloudy weather. Oats were heading somewhat shorter than usual.

For the whole month the mean temperature of the air was slightly below normal, and the average rainfall was less than the seasonable amount.

At the close of the month the crop correspondents of the State Weather and Crop Service submitted their reports from the several counties of the state, showing average condition of crops as follows: Corn, 76 per cent; winter wheat, 61; spring wheat, 88; oats, 83; barley, 93; rye, 87; flax, 88; timothy, 89; clover, 89; millet, 100; broom corn, 82; potatoes, 92; sweet potatoes, 92; sorghum, 85; apples, 84; plums, 72; grapes, 80. The average decrease in the acreage of corn, compared with last year, is 6 per cent.

JULY.

The month of July brought weather conditions favorable to the seasonable advancement of growing crops, and also for harvesting matured soil products in excellent condition.

The temperature was slightly above normal, with an average amount of sunshine, and somewhat deficient rainfall in the larger part of the state.

The first decade was characterized by excessive heat and humidity of the air, affording tropical conditions for the rapid advancement of corn, potatoes, flax, and vegetables, and causing a tendency to rust in spring wheat, oats, and barley.

The weather during the second decade was cooler than usual, and generally dry, checking the development of rust, and affording favorable conditions for haying and harvesting. Corn made substantial progress, and was reported on the 20th to be in all stages of growth, from a foot high to size of tasseling and silking.

Moderate temperature and generally clear weather prevailed from the 20th to the 29th, during which time harvest work progressed under favorable conditions for securing the matured crops in the best possible order.

The month closed with a hot wave of considerable severity, causing much apprehension of damage to corn and other growing crops by hot winds and drouth.

At the central station, on the 31st, the temperature registered 98°, which was the maximum of the season up to that date. The close of the month brought numerous reports of the prevalence of drouthy conditions, which were especially severe in the southwest district. But there were relatively few reports of any serious actual damage to corn. The situation was described to be critical, and great damage would result if the drouth was protracted many days longer.

At the close of the month the harvest of hay and grain was practically completed, except that some late-seeded fields of oats and spring wheat remained to be cut in the northern districts. Good progress had been made in stacking grain, and threshers were in active operation in all districts, with varying results as to yield.

AUGUST.

The first decade of August was favorable for the development of all unharvested crops, the daily mean temperature being slightly above normal and in the larger part of the state refreshing showers and partly cloudy skies brought relief from the hot and drouthy weather of the latter part of July. Reports from weather-crop observers indicated that the early planted corn promised to reach maturity by the 20th to the 25th of September.

The second decade was cool and dry, retarding the growth of corn, and also unfavorable for grass and potatoes. Most of the days were bright and warm, but the temperature fell rapidly at nightfall, and on the morning of the 20th the frost line was reached at numerous localities, though no damage resulted except the severe check to vegetable growth. Numerous reports were received that corn on uplands and naturally light soil was being "fired" from effects of the prevalent drouthy conditions. The late corn and potatoes suffered most severe damage during this period. Pastures became bare and fall plowing was delayed.

The balance of the month brought measurable improvement in temperature, but the average was below normal and the rainfall was generally deficient. At the close of the month all sections were very deficient in moisture. The cool nights, however, afforded some relief from the prevailing drouth. On the last two days of the month the early planted corn began to show marked changes in color, indicating earlier maturity than had been anticipated. The pastures were generally brown, and where overstocked presented a bare appearance. Potatoes made but little growth and the outlook was not favorable for more than a half crop. The month was favorable for threshing and for harvesting wild hay, which has been secured in fine condition.

SEPTEMBER.

This month brought a marked change and the summary ending of a peculiar and fitful crop season. The first half broke all former records of September weather for the corresponding period, by abnormally high temperatures, intense insolation, hot southerly winds, and severe drouthy conditions. At the central station the sum of the excess in temperature was 228°

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ACREAGE IN CROPS AND NUMBER OF LIVE STOCK, BY COUNTIES.

Monroe	4 323	....	47,740	12,240	3,604	....	28,500	441	....	550	18,366	7,850	4,411	84,636	3,788
Montgomery	3,734	15,312	100,145	21,315	853	....	13,179	3,134	....	1,480	26,668	11,115	1,337	39,228	30,327
Muscatine	5,370	828	70.720	24,080	3,174	4,170	28,220	2,767	....	1,660	24.518	11,241	1,304	45,461	5,418
O'Brien	142	37,580	67,037	56,294	820	42,124	9.350	18,241	6,080	1,517	28,100	10.718	3,199	45,799	22,658
Osceola	....	44,010	36.230	31,632	430	29,560	4,050	17,670	6,290	1.140	11.854	6,867	733	26,087	10,696
Page	10,127	7,163	136,520	21,730	785	211	27.825	4,708	....	1,928	30,267	14,957	5,462	70,924	36,608
Palo Alto	12	9,380	64,090	52,420	1.172	6,016	5 399	55,183	8,830	1,130	24,226	7,518	1,146	37,839	25,944
Plymouth	77	90,142	140 682	63,483	1,401	11,812	10,257	38,077	2.090	2,710	34,108	14.579	1,794	60,051	44,318
Pocahontas	....	10,735	79,408	55.790	999	5,859	5,230	52.985	9,177	1.701	31,366	10,719	1,795	60,947	47,449
Polk	768	6,535	99,837	37,457	1,522	89	22,339	12,938	....	4,590	29.639	17.438	2,310	41,468	34,931
Pottawattamie	1,259	43,390	210.144	50,249	2,014	3,082	25,029	21,663	279	3,890	51,827	17,832	5,448	95 588	19.915
Poweshiek	618	750	98,204	50,489	2,444	1,140	38.540	1,702	....	1,170	41,421	15,224	3,754	75,921	25,702
Ringgold	2,200	170	94,870	25,570	1,550	270	38,990	1,950	....	710	32.454	14,816	4,285	55,800	16,252
Sac	....	12,554	120,740	59,270	1,625	7.310	17.625	22,440	3,980	1,620	40,067	12,197	1,791	63,962	24,595
Scott	15,173	3,206	61.880	32,960	2,770	20 688	26.320	6,348	....	6,220	26,141	12,146	1,870	50,705	10,126
Shelby	350	28,640	110,776	36,917	1,560	10,130	19,620	10,490	....	2,160	29,414	12,384	1,698	72,872	28,240
Sioux	....	130,940	120,888	66.220	599	35,210	2,730	35,146	1,533	1,735	24,157	14,561	2,885	47,683	31,803
Story	116	3,187	110,748	54,970	2,646	790	19.036	26.850	350	1,160	31,719	14.202	3,054	46,440	28,966
Tama	610	5,244	142,830	61,898	3,028	24,680	30,240	11,387	....	1,580	49.360	15,612	4,108	87,207	26,659
Taylor	6,296	565	95,650	36,270	581	273	35,490	2,582	....	4,033	32.787	23,798	4.879	81,531	29,536
Union	468	248	72,530	22 560	859	....	26.970	1,118	....	980	26,204	9,509	3,644	40,930	34,439
Van Buren	9,102	145	44,704	14,950	1.590	....	18,110	....	....	430	23,770	10.801	37,048	41.397	2,288
Wapello	7,442	68	64 810	15,570	2,239	....	31,450	81	....	1,290	21.544	11,979	9,804	49,558	11,328
Warren	994	4,869	86.470	27,688	3,344	....	30,310	2,205	....	2,105	31,493	14,901	4,018	97,841	57,136
Washington	2,957	....	90 360	35,190	3,552	....	41,140	675	....	806	33,669	15,671	2.914	72,566	36,238
Wayne	1,424	....	72,290	21,386	2,620	....	48,413	639	53	1,720	33,219	13,058	7,654	44,160	6,791
Webster	....	4,345	114,040	65,630	1,880	4.720	8,270	50,460	4,450	1,730	34,843	14.516	1,367	70,861	42,888
Winnebago	....	16,540	38,146	37.176	128	6,237	3.736	37,610	10,490	610	13.289	7,005	885	14,066	17,251
Winneshiek	502	4,800	68.290	71,870	2,097	15,219	35,454	10,387	10,718	1,340	36.890	18,973	3,778	78,158	2 608
Woodbury	151	45 320	170,270	40,026	2,236	4.620	9,330	33,926	1.410	2,410	35.920	15,184	3.165	78,708	20,173
Worth	7	5,855	38,482	51,650	842	11,530	11.118	21,822	11,080	850	22,709	6,887	2,333	29,735	22,676
Wright	....	6,056	85,730	65,410	335	4,710	11,850	37,517	10,030	970	26,946	12,232	1,529	48,098	50,089
Total	194,466	1,076,837	8,610,145	4,405,782	226,196	551,867	2,159,334	1,156,638	249,882	163,248	8,008,024	1,220,068	464,791	5,598,691	2,193,593

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FINAL CROP REPORT, 1897—AVERAGE PER ACRE AND TOTAL YIELD BY COUNTIES.

																	CULTI-			
Montgomery	15	40,930	15	230,130	28	2,603,770	31	665,775	16	14,138	...	....	...	....	85	51,800	1.5	19,763	1.2	8,760
Muscatine	12	53,410	14	11,590	34	2,356,540	33	770,560	14	44,430	23	116,750	...	....	43	79,680	1.8	36,686	1	2,767
O'Brien	...	....	10	375,900	27	1,809,839	23	1,576,232	8	6,560	23	933,728	12	72,960	65	98,605	1.1	10,285	1	9,350
Osceola	...	....	8	352,030	23	911,930	23	883,816	15	6,450	25	739,000	10	62,900	100	114,000	1.5	6,075	1.4	24,738
Page	16	113,280	15	105,945	23	3,651,432	36	782,230	17	13,345	29	6,119	...	....	47	90,616	1.6	44,920	1.5	7,062
Palo Alto	...	....	11	103,130	30	2,043,700	37	1,939,540	8	9,376	28	138,418	11	91,630	75	84,750	1.5	9,085	1.3	71,787
Plymouth	...	....	12	1,031,704	29	3,870,392	27	1,727,511	15	21,015	23	297,800	7	14,620	50	155,500	1.5	15,395	1.4	43,307
Pocahontas	...	....	15	160,875	27	2,037,186	29	1,617,910	15	14,935	25	146,475	9	82,593	60	102,240	1.7	8,891	1.5	79,477
Polk	20	11,330	16	104,590	29	2,880,773	30	1,124,710	18	27,498	20	1,730	...	....	42	192,780	1.6	35,742	1	12,938
Pottawattamie	10	9,500	15	650,850	30	6,304,320	35	1,758,715	18	36,793	21	64,722	...	....	40	155,600	1.8	45,054	1.5	82,495
Poweshiek	18	7,434	15	11,250	30	2,946,120	33	1,636,137	15	33,660	24	27,330	...	....	55	64,350	1.9	73,236	1.5	2,558
Ringgold	13	20,150	9	1,530	23	2,037,140	20	511,400	13	20,150	...	....	...	....	42	31,500	1.6	62,384	1.1	2,145
Sac	...	....	14	175,616	23	3,211,880	31	1,837,370	16	16,000	25	182,750	8	31,840	32	51,840	1.6	28,200	1.4	31,216
Scott	8	97,104	15	48,030	33	2,012,040	30	937,900	15	34,050	25	514,700	...	....	89	550,580	1.5	31,032	1.5	9,597
Shelby	10	2,500	13	374,330	30	3,323,280	35	1,293,093	18	23,030	25	253,000	...	....	85	183,600	1.5	29,430	1	10,490
Sioux	...	....	10	1,301,400	29	3,316,730	23	1,854,160	20	11,930	27	930,770	8	12,264	68	117,980	1.4	3,822	1.5	52,719
Story	...	....	16	50,932	31	3,231,510	33	1,814,040	15	39,630	20	15,800	8	2,800	45	52,200	1.5	28,554	1.2	34,620
Tama	18	10,930	14	73,416	32	2,934,530	31	1,917,745	18	64,504	27	536,360	...	....	46	72,680	1.7	51,408	1.5	17,052
Taylor	12	51,480	10	5,650	23	2,623,200	25	653,750	15	8,715	20	5,430	...	....	57	229,831	1.6	56,784	1.5	3,870
Union	16	5,880	15	3,720	22	1,593,760	23	518,880	14	13,033	...	....	...	....	85	34,300	1.6	43,152	1	1,118
Van Buren	7	63,714	5	725	27	1,207,038	20	299,000	9	14,310	...	....	...	....	55	23,650	1.2	21,742	...	....
Wapello	10	55,820	13	816	27	1,749,370	23	358,110	13	29,107	...	....	...	....	55	70,950	1.5	47,175	...	....
Warren	15	10,410	11	63,559	30	2,516,230	23	776,098	18	58,398	...	....	...	....	64	134,720	1.6	48,496	1.2	2,646
Washington	16	87,600	...	....	30	2,548,500	21	814,550	18	63,913	...	....	...	....	54	43,524	1.5	61,710	1	675
Wayne	10	11,200	...	....	23	1,672,670	22	469,373	11	23,820	...	....	...	520	36	61,920	1.4	67,748	1	689
Webster	...	....	15	65,175	26	2,816,788	23	1,837,640	20	37,600	22	103,810	10	44,500	55	95,150	1.8	14,886	1.5	75,690
Winnebago	...	....	10	165,900	26	991,796	24	892,234	12	1,535	20	124,740	9	91,410	80	48,800	1.5	5,604	1.3	50,193
Winneshiek	15	753	17	81,600	31	2,251,570	29	2,083,630	14	29,358	25	330,475	10	107,180	68	90,120	1.5	54,181	1	10,337
Woodbury	10	1,510	12	543,840	25	4,356,750	27	1,080,702	10	24,360	20	93,400	11	15,500	45	108,450	1.5	13,995	1.4	47,496
Worth	...	....	11	64,405	26	993,533	33	1,704,450	16	13,472	23	288,250	12	133,360	84	71,400	1.6	17,788	1.3	27,718
Wright	...	....	15	90,840	27	2,314,710	30	1,962,300	20	6,700	24	103,040	9	90,450	46	44,620	1.4	16,500	1.2	45,008
Total yield	...	1,671,454	...	12,911,600	...	239,452,150	...	132,271,155	...	3,490,344	...	14,076,856	...	2,493,600	...	10,051,919	...	3,362,287	...	1,939,117
Av. per acre	13	....	13.4	....	29	....	30	....	15	....	25	....	10	....	60	....	1.6	....	1.3	....

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Great care has been exercised to make a reliable computation of the acreage harvested and total yield by counties, and the result is believed to be approximately correct.

Wheat.—The average yield of winter wheat is 13 bushels per acre, and the total product of the state is 1,671,454 bushels. The average per acre of spring wheat is 13 bushels, and the total amount harvested is 12,941,600 bushels. These figures show a total wheat output of 14,613,054 bushels. Average price at farms, 74 cents per bushel.

Corn.—The reports show a variable output of this great staple, the average yield by counties ranging from 22 to 35 bushels per acre. The state average is 29 bushels per acre, estimated on the acreage actually harvested, which is from 3 to 7 per cent less than the area planted; the reduction resulting from unfavorable conditions in the season of planting and cultivation. The acreage planted was 8,610,145 acres; loss by various causes, 356,623 acres, leaving 8,253,522 acres as the area harvested. The total yield for the state is found to be 239,452,150 bushels, all of which is dry and sound. While the result is somewhat below the Iowa average, yet the output of merchantable corn is fully 60,000,000 bushels in excess of the amount that appeared to be possible to obtain in the early part of September. The phenomenally dry and warm weather of the fall months brought to maturity a large portion of the late planted fields that would have been wholly unmerchantable if normal conditions had prevailed. The average price is 17 cents per bushel.

Oats.—Average per acre, 30 bushels; total yield, 132,571,155 bushels; average farm price, 16 cents per bushel.

Rye.—Average yield per acre, 15 bushels; total product, 3 490,344 bushels; farm price, 34 cents per bushel.

Barley.—Average per acre, 25 bushels; total yield, 14,076,856 bushels; price at farms, 23 cents per bushel.

Flax.—Average per acre, 10 bushels; total yield, 2,498,600 bushels; price, 87 cents per bushel.

Potatoes.—Average yield per acre, 60 bushels; total yield, 10,051,919 bushels; average farm price, 45 cents per bushel.

Cultivated Hay.—Average yield per acre, 1.6 tons; total yield, 3,362,287 tons; farm price, $4.50 per ton.

Wild Hay.—Average yield, 1.3 tons per acre; total yield, 1,939,117 tons; farm price, $3.70 per ton.

Buckwheat.—Average yield per acre, 13 bushels; total yield, 224,120 bushels; average price, 51 cents per bushel.

Timothy Seed—Average yield, 3.5 bushels per acre; total yield (estimated) 785,000 bushels; average farm price, $1.10 per bushel.

Clover Seed.—Average yield per acre, 1.8 bushels; yield (on estimated acreage), 105,000 bushels; average farm price, $2.80 per bushel.

Millet Seed.—Product estimated, 125,000 bushels; average price, 33 cents per bushel.

Sweet Potatoes.—Bushels produced (estimated), 225,000; price per bushel, 90 cents.

Sorghum.—Estimated value, $375,000.

Broom Corn.—Estimated value, $35,000.

Vegetables and Fruit.—Estimated value, $5,500,000.

Corn Fodder.—In field and shock, worth $9,500,000.

Pasturage.—Value estimated, $28,000,000.

The average farm price of horses appears to be $42 per head; cows, $33 per head; wool averaged 15 cents per pound. The amount of fall plowing is placed at 65 per cent of the average.

Despite the floods of spring, and the severe drouth of the latter part of summer and the fall, the season has been fairly productive; and the enhanced prices have brought an increased prosperity to the producers' The corn crop, though about 75,000,000 bushels short of the total yield in 1896, is worth materially more in feeding value and for storage. About 60 per cent is of full weight and very sound; the balance is shrunken more or less by premature ripening, but the crop as a whole is much better than was anticipated.

GENERAL CROP SUMMARY—1897.

PRODUCTS.	Yield per acre.	TOTAL PRODUCT.	FARM VALUE DEC. 1.
Wheat	13	14,613,054 bus.	$ 10,813,660
Corn	29	289,452,150 bus.	40,706,806
Oats	30	132,571,155 bus.	21,211,384
Rye	15	3,490,344 bus.	1,186,716
Barley	25	14,076,856 bus.	3,237,676
Flax	10	2,498,600 bus.	2,173,783
Potatoes	60	10,051,919 bus.	4,523,363
Cultivated hay	1.6	8,363,287 t'ns.	15,130,891
Wild hay	1.3	1,939,117 t'ns.	7,174,733
Buckwheat	13	234,120 bus.	114,351
Timothy seed	3.5	785,000 bus.	883,500
Clover seed	1.8	105,000 bus.	394,000
Millet seed	......	125,000 bus.	41,250
Sweet potatoes	......	225,000 bus.	202,500
Sorghum	......	....	875,000
Broom corn	......	....	35,000
Fruit and vegetables	......	....	5,500,000
Corn fodder	......	....	9,500,000
Pasturage	......	....	28,000,000
Total	......	....	$151,084,069

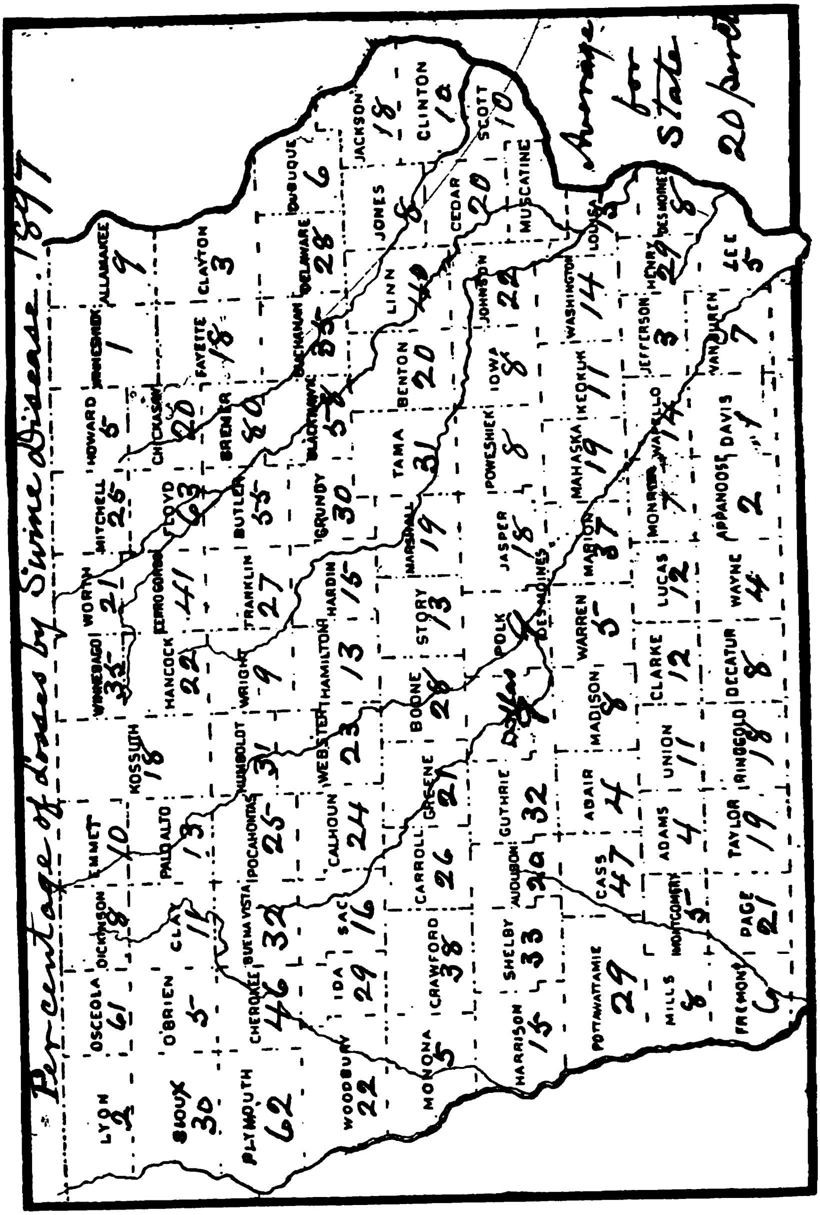
A large increment in value is gained by the consumption of these soil products on the farms, in the production of beef, pork, mutton, wool, dairy goods, poultry, horses, etc. As finally marketed the staple crops of this state usually bring 30 to 50 per cent above the average prices current at the farms at the close of the season. The soil output of 1897 will yield over $200,000,000 to the farmers of Iowa.

LOSSES BY SWINE DISEASE.

The crop correspondents of this bureau were asked to report the approximate percentage of loss of hogs by cholera or other disease, for the current season to December 1st. The reports have been tabulated by counties, and the estimates are shown on the engraved chart in this issue. The state average appears to be about 20 per cent. This shows a decline in the virulence of the epidemic compared with 1896.

Many correspondents state that the returns do not indicate the total losses to the farmers, many of whom shipped off their herds of all ages and stages of growth as soon as the epidemic appeared in their vicinity.

It is probable that the losses will aggregate about two-thirds of the total last year. Expressed in cash values, the direct and indirect losses will amount to fully $10,000,000.


Percentage of Losses by Swine Disease 1897
Average for State 20 per ct
LYON 2
OSCEOLA 61
DICKINSON 8
EMMET 10
KOSSUTH 18
WINNEBAGO 35
WORTH 21
MITCHELL 25
HOWARD 5
WINNESHIEK 1
ALLAMAKEE 9
SIOUX 30
O'BRIEN 5
CLAY 11
PALO ALTO 13
HANCOCK 22
CERRO GORDO 41
FLOYD 63
CHICKASAW 20
FAYETTE 18
CLAYTON 3
PLYMOUTH 62
CHEROKEE 46
BUENA VISTA 32
POCAHONTAS 25
HUMBOLDT 31
WRIGHT 9
FRANKLIN 27
BUTLER 55
BREMER 60
BUCHANAN 35
DELAWARE 28
DUBUQUE 6
WOODBURY 22
IDA 29
SAC 16
CALHOUN 24
WEBSTER 23
HAMILTON 13
HARDIN 15
GRUNDY 30
BLACKHAWK 57
BENTON 20
LINN 40
JONES 8
JACKSON 18
CLINTON 10
MONONA 5
CRAWFORD 38
CARROLL 26
GREENE 21
BOONE 26
STORY 13
MARSHALL 19
TAMA 31
IOWA 8
JOHNSON 22
CEDAR 20
SCOTT 10
MUSCATINE
HARRISON 15
SHELBY 33
AUDUBON 20
GUTHRIE 32
Dallas 9
POLK 6
DES MOINES
JASPER 18
POWESHIEK 8
MAHASKA 19
KEOKUK 11
WASHINGTON 14
LOUISA 3
POTTAWATTAMIE 29
CASS 47
ADAIR 4
MADISON 8
WARREN 5
MARION 37
MONROE 7
WAPELLO 14
JEFFERSON 3
HENRY 29
DES MOINES 8
MILLS 6
MONTGOMERY 5
ADAMS 4
UNION 11
CLARKE 12
LUCAS 12
FREMONT 6
PAGE 21
TAYLOR 19
RINGGOLD 18
DECATUR 8
WAYNE 4
APPANOOSE 2
DAVIS 1
VAN BUREN 7
LEE 5

WEATHER-CROP BULLETINS.

SUMMARIES OF WEEKLY BULLETINS ISSUED DURING THE CROP SEASON OF 1897.

BULLETIN NO. 1, APRIL 6TH.

The past winter brought more than the normal amount of precipitation, and the spring has been unusually wet, with less than the normal amount of drying winds and sunshine. As a result, the streams, sloughs and ponds have been filled to overflowing, the soil is thoroughly saturated, the roads are well nigh impassable, and field work has been generally impracticable.

The season is ten days to two weeks late in all districts. A few reports show that a beginning was made in seeding wheat and plowing grass lands prior to the heavy rains of April 1st to 4th. It will now require several days of drying weather to put the soil in condition for field work. The rains have brought out the frost in all sections except the northern districts. The conditions have been favorable for grass, which has made a fair start.

Generally unfavorable reports are received from districts where fall wheat has been sown. The plants appear to have been winter-killed to more than the usual extent. Fall rye has fared somewhat better. Grass has wintered fairly well, except in low ground, where it has been covered with ice and water.

With seasonable warmth and drying weather in the near future, the agricultural conditions will be rapidly improved.

BULLETIN NO. 2, APRIL 13TH.

The past week was unseasonably cold, with excessive cloudiness. The daily mean temperature ranged from 5° to 7° below the normal. But the precipitation was generally light, and a moderate improvement is reported in the condition of the soil.

Reports from all districts show that a beginning has been made in sowing wheat, oats and barley, though in many cases the soil was not in good condition to secure the best results. In the southern districts some early potatoes have been planted.

The week closes with unsettled weather, and conditions not wholly encouraging to farmers who are waiting for the drying out of their water-soaked lands. The season is at least two weeks later than the average, and the delay in seeding will most likely cause a decrease in the prospective acreage of small grain crops.

Fruit buds, except peaches, appear to be all right.

BULLETIN NO. 3, APRIL 20TH.

There was a continuance of cold weather during the larger part of the past week, but the rainfall was generally light, and there was more sunshine and drying wind. The daily mean temperature was from 5° to 7° below normal. The heaviest rainfall was reported in the northeast and east central districts. Since the 15th inst. the conditions have been generally more favorable for farming operations, and substantial progress in seeding has been made in all parts of the state.

In the three northern districts a good beginning has been made in sowing wheat, oats and barley, and the work is being rapidly pushed. In the central belt seeding is over half done on the average, the work being hindered only on the wet and undrained lands. In the southern belt the work is further advanced, except where the land is naturally very retentive of moisture.

On the whole farming prospects are materially improved, though the season is fully two weeks late in respect to seeding and germination.

Grass has made a good start, the wet and cool weather giving a substantial foundation for a large crop.

BULLETIN NO. 4, APRIL 27TH.

The first of the week was unseasonably cold, with frost, ice and sleet. This was followed by much higher temperature, making the average for the week about normal.

The rainfall was phenomenally heavy in the central and southern districts, the amounts reported ranging from 2.50 to 6.70 inches. The average for the whole state during the week was more than the normal amount for the month of April. All former records of April precipitation in this state have been broken. The week brought a culmination of the bad weather of this most unfavorable season.

As a result all farm operations have been delayed and very little progress has been made in finishing up seeding and making preparations for planting. In some sections reports show that from 30 to 50 per cent of the area set apart for oats has not been seeded. There will be a decreased acreage of oats on this account.

There are no reports of damage resulting from the freezing temperature on the 19th and 20th. Fruit of all kinds appears to have escaped any serious injury. Grass is growing rapidly, and early sown spring wheat and oats are doing notably well. With the close of the week the weather conditions appear much more encouraging.

BULLETIN NO. 5, MAY 4TH.

The first half of the past week was warm, and the latter part unseasonably cool, the temperature reaching the freezing point. But the rainfall was generally light, and there has been a decided improvement in weather conditions as affecting farm work and the growth of vegetation. So far as can be learned at this time no material damage was caused by frost.

Good progress has been made in seeding, and in preparing the ground for planting where the soil is dry enough for field work. Greater advancement has been made in the northern districts than in the southern half of the state where the rainfall has been much heavier. In the southern and central districts, a considerable acreage of land intended for wheat, oats and barley will be planted to corn or other crops. And a large area of bottom lands that were cultivated during the recent dry seasons will not be in condition to be farmed this year.

Grass has generally made seasonable growth, and pastures now afford considerable feed for stock. The prospects for hay are unusually good.

BULLETIN NO. 6, MAY 11TH.

The daily mean temperature during the past week ranged from 5° to 7° above the normal, and the average amount of sunshine was fully 95 per cent. On the evening of the 8th timely showers, fairly well distributed, benefited the crops and put the soil in better condition by softening the clods and the encrusted surface.

The fine weather in the first decade of the month has advanced vegetation rapidly toward the normal stage of growth, and has been highly favorable to rapid progress in field work. A very large area has been prepared for corn, and reports from all districts indicate that a good beginning has been made in planting, and the work is now being rapidly pushed to completion. With a continuance of the present favorable conditions the bulk of the corn acreage will be planted about as early as in the average of the past ten years.

Spring wheat, oats and barley are generally doing fairly well, the chief drawback being a tendency of the soil to bake in fields where the ground was too wet when seeded.

Plum, cherry and apple trees are in full bloom, and small fruit is promising. Pasturage is fine. Potatoes and garden truck are generally planted.

BULLETIN NO. 7, MAY 18TH.

The past week was unseasonably cool, with a prevalence of northwest winds and less than the normal amount of sunshine. The average temperature was from 3° to 5° below normal. There were light frosts in all districts, but no material damage has been observed. The rainfall was generally light; and in the northwest section warm showers would be beneficial to all crops.

Fair progress has been made in preparing the ground for planting; and in all districts a considerable area has been planted, the amount ranging from one-third to three-fourths of the total acreage. With favoring conditions the bulk of the planting will be completed by the 22d. Reports indicate a probable corn acreage very nearly as great as that of 1896.

The condition of spring wheat, oats and barley is generally satisfactory, though the growth has been retarded somewhat by cold winds. Grass is doing well. Apples, plums, cherries and small fruit are quite promising.

BULLETIN NO. 8, MAY 25TH.

Weather conditions during the past week were quite variable. The daily mean temperature the first half of the week was above normal, and the latter half unseasonably cool, the temperature falling dangerously near the frost line. On the 19th and 20th local showers of considerable severity occurred in portions of the central and northern districts. The average rainfall for the state, however, was below the normal amount. Fair progress has been made in corn planting, and the work is nearing completion in the larger part of the state. In localities where plowing was retarded by wet condition of the soil planting will not be completed before June 1st. Early planted corn is generally making a good stand, and the work of cultivation is in progress. Not more than the usual amount of replanting is necessitated by defective seed.

In portions of the central and southern districts oats and spring wheat are somewhat injured by the encrusted condition of the soil. Warm rains are needed for grain and grass in many localities.

On the whole, however, the crop prospects are fairly promising. Cherries, plums, apples and berries are apparently doing well.

BULLETIN NO. 9, JUNE 1ST.

The past week was unseasonably cold and cloudy. The deficiency in temperature at the central station was 37°, and the daily mean ranged from 5° to 7° below normal throughout the state. The amount of sunshine was from 50 to 70 per cent. Light frosts are reported from numerous localities, but the damage has been slight. The rainfall was generally light and insufficient for the needs of the crops; but portions of the east central and southern districts received copious showers which were very beneficial.

Corn planting is practically completed, and cultivation is general. Variable reports are received as to the stand secured, but the average condition appears to be below the normal of that crop. The amount of replanting made necessary by defective seed and depredation of worms is much greater than early reports indicated. In many sections the amount of replanting will be from 25 to 33 per cent of the total corn acreage.

The average condition of oats, spring wheat and barley is good except in portions of the southern districts. The cool weather has been favorable for grass and small grain crops. Fruit is generally promising.

BULLETIN NO. 10, JUNE 8TH.

The week opened with a frost of considerable severity in the northern and central districts, and this was followed by seven days of unseasonably cool weather, the daily mean temperature being from 6° to 7° below normal. The amount of rainfall was generally deficient.

The worst effects of the freezing temperature of May 31st have been observed in fruit and vegetable gardens. Grapes were severely hurt, especially in the northern districts. All tender vines and plants in the northern half of the state were damaged to some extent.

The injury to field crops by the frost has not been as great as was indicated by first reports. But the continued cold weather has been unfavorable to corn, causing increased difficulty in procuring a good stand from seed that was deficient in vitality. A great deal of replanting has been done, and with the most favorable weather conditions in the future the stand will be below an average. The reports of 700 crop correspondents of the state service, made June 1st, rated the condition of corn at 79 per cent. The crop has only been able to take root and hold its ground since that date.

Oats, spring wheat, barley and grass are doing fairly well in the larger part of the state. Spring seeding of timothy and clover shows up remarkably well.

Just at this time there are no alarming indications of an over production of the staple crops of the country.

BULLETIN NO. 11, JUNE 15TH.

The first half of the week was cool and the last half warm, giving an average of about normal temperature. There was also a seasonable amount of sunshine. The rainfall, in the form of light and scattering showers, was generally below the seasonable amount, and much short of the requirements of all crops.

Corn has responded quickly to the influence of warm weather, showing a better color and more vigor. Wherever a good stand has been secured the condition of the crop is fairly good, though the plant is small for the middle of June. Vigorous attempts have been made to improve the stand by replanting, and in numerous cases it has been necessary to go over the fields the third time. At the best the condition of the crop in this respect will be 10 to 20 per cent below the average. Fair progress has been made in cleaning out the crop.

In four-fifths of the state the surface is too dry for the best advancement of small grain and hay, though no great injury has yet resulted from the lack of rain. The pastures and meadows are showing some effects of dry weather, and rain is needed, especially to sprout the seed in replanted corn fields.

Clover cutting will be commenced within the coming week.

BULLETIN NO. 12, JUNE 22D.

The past week brought seven abnormally warm days, the daily average temperature being from 6° to 7° above the normal. For nine consecutive days at the central station the daily temperature has been from 2° to 12° in excess, making a period of phenomenal heat for the month of June.

The rainfall has been unusually variable, coming in the form of local showers, some of them accompanied by severe wind squalls and considerable electric force. The amount of moisture is sufficient for present needs in about three-fifths of the area of the state; the balance is suffering to some extent from protracted dry weather.

All reports indicate that corn has made rapid advancement wherever it has received good culture and the soil conditions are favorable. The chief drawback to this crop is that the stand is generally below the average, and this can not be fully remedied. The color is good, but the plants are generally below the seasonable height and normal condition.

Wheat, oats, barley and grass are doing fairly well in the larger part of the state. In all districts, clover haying is in progress. Potato bugs and other insects are more than usually troublesome.

BULLETIN NO. 13, JUNE 29TH.

The past week was slightly cooler than usual, the average daily deficiency being about 2°. The rainfall was generally ample, the northwest district receiving the least amount. Heavy local showers occurred in the central and southern districts, and some damage resulted from wind and hail.

On the whole the week was favorable for grass, potatoes, wheat, oats and barley; and with some local exceptions corn has made fair progress. The condition of the corn crop is extremely variable, ranging in height from two inches to two feet. Some of the more advanced fields will be laid by before the 4th, and others are now being cultivated the first time, with a close race between corn and weeds. The average stand in the state is not above 80 per cent.

Haying operations have been retarded by showery and cloudy weather. Oats are heading short, and the crop cannot give a normal yield. The most promising cereal crops in the state are spring wheat and barley, with a large increase in the acreage of wheat.

BULLETIN NO. 14, JULY 6TH.

The average daily temperature of the past week was 3° to 5° above normal, and the heat was unusually oppressive on account of excessive humidity of the air. The rainfall, in the form of light showers, was generally less than the seasonable amount, but some portions of the southern district received a considerable excess, making the soil too wet to cultivate the corn fields.

The week has been very favorable for the growth of pasturage, potatoes, flax and garden truck, and for corn that has been properly cultivated. Corn has made fine progress except where cultivation has been hindered by excess of moisture. In all districts early planted fields are being laid by. Hay making is in progress, but the work has been materially hindered by light showers and cloudiness. Spring wheat is generally filling well, and no reports are received of damage by rust or insects. Oats and barley are improving.

The July reports of the crop correspondents of the State Weather and Crop Service have been tabulated, showing the average condition of crops to be as follows: Corn, 76 per cent; winter wheat, 61; spring wheat, 88; oats, 83; barley, 93; rye, 87; flax, 88; timothy, 89; clover, 89; millet, 100; broom corn, 82; potatoes, 92; sweet potatoes, 92; sorghum, 85; apples, 84; plums, 72; grapes, 80. The average decrease in the acreage of corn, compared with last year, is 6 per cent.

BULLETIN NO. 15, JULY 13TH.

The past week brought five days of unseasonably high temperature, which were followed by two days of cooler weather with refreshing showers. The amount of rainfall was variable, but nearly all sections received sufficient moisture for present needs. The showers on the 9th were heavy in some localities, with brisk winds, causing heavy grain and hay to lodge to some extent; but on the whole the rains were very beneficial to all crops.

The heat and humidity gave the corn crop a wonderful growth, and no damage resulted from hot winds. This crop is now generally laid by, in variable condition as to size, stand and freedom from weeds. The early planted corn is coming into tassel, at fair height; and the general reports indicate about three-fourths of an average crop.

The hot and moist weather was somewhat unfavorable to spring wheat and oats, which are now at the stage to receive injury by rust and blight. Reports indicate the appearance of rust in numerous sections, but the cooler weather has checked its progress, and the extent of damage may not be as great as has been anticipated.

Barley and rye are being harvested, and some early sown oats will be cut within the coming week. Satisfactory progress has been made in securing the hay crop. Pastures are excellent. Potatoes are doing better.

BULLETIN NO. 16, JULY 20TH.

The past week was cooler than usual, with less than the normal rainfall except in a few localities. The deficiency in the daily mean temperature was from 5° to 7°. The amount of sunshine was about normal.

It was an ideal week for field work, and has been improved to the utmost. Good progress has been made in the hay harvest, and a large amount is secured in excellent condition. Rye is in shock, and barley is being harvested. A good start has been made in cutting early oats.

The weather conditions have been highly favorable for spring wheat, checking the tendency to rust and favoring the filling and ripening. The bulk of this important crop is in fair condition, and the total acreage this season is above 1,000,000 acres.

Corn has made substantial progress wherever it has received good cultivation. It is in all stages of growth, from a foot high to the tasseling size. The acreage planted is very large, being about 8,600,000 acres, and in about two-thirds of that area it gives promise of a fair crop, with favorable weather for the balance of the season.

We are just now in the midst of the usual midsummer dry weather period, and rain is generally needed for all growing crops, especially potatoes.

BULLETIN NO. 17, JULY 27TH.

This has been a week of fine growing weather. The temperature was generally seasonable, and except a few scattered localities all parts of the state have been copiously watered. Some damage resulted from severe local wind and electric storms, on the night of the 23d.

The rains were timely, and especially beneficial to corn, potatoes, pastures, blackberries and garden vegetables. Early corn is doing notably well, and generally there is sufficient moisture to carry it safely through the tasseling and earing stage. Belated corn is doing its best, under varying conditions as to tillage and freedom from weeds.

Fair progress has been made in the harvest fields. The hay crop has been mostly secured, and the larger part of the oats crop is in shock or stack. The harvest of spring wheat is in progress, and the bulk of the crop will be in shock or stack before August 1st. Some reports have been received of injury to wheat by rust or scab, but the extent of damages can only be determined by threshing returns. The average condition is not likely to be reduced below previous estimates.

Threshing operations begun in barley, oats and winter wheat.

BULLETIN NO. 18, AUGUST 3D.

The week was unseasonably warm, with much less than normal rainfall except in a few favored localities. The greatest excess of temperature was registered on the last two days of the week, causing some apprehension of damage to crops by hot winds; but a change of wind direction and lower temperature on the night of August 1st relieved anxiety on that score.

The week was favorable for work in the harvest fields, and satisfactory progress has been made. The harvest of oats and spring wheat is completed, except late seeded fields in the northern districts. A good deal of stacking has been done, and threshers are at work in all sections, with varying results as to yield.

The harvest season as a whole has been much more favorable than last year, and the bulk of hay and grain has been secured in excellent condition.

Corn has made fairly good progress during the week, and substantial gains during July. Reports received from the larger number of crop correspondents of this bureau show the average condition of corn on August 1st to be 80.5 per cent, as against 76 per cent July 1st.

BULLETIN NO. 19, AUGUST 10TH.

The weather during the past week was favorable for all growing crops. The daily mean temperature was slightly above normal, and refreshing showers, with partly cloudy skies, brought relief from drouthy conditions in all districts. In the larger part of the state the supply of moisture is ample for all present needs, and complaints of injury by drouth are heard from only a few scattered localities.

Corn has made fine progress in all sections. Variable replies have been received from crop observers to the inquiry in relation to the length of time required under normal conditions to mature the corn crop and place it beyond danger of harm by killing frosts. The larger number report that early planted corn will be practically safe about the 15th to 20th of September. Late planted fields, that were well tilled, may be fairly matured by October 1st. An unknown percentage of the crop will need warm, drying weather through the first ten days of October to make merchantable corn. It is highly probable that more than the usual amount, at the rear of the procession, will be cut off prematurely by killing frosts.

Threshing is in progress, and reports are showing fair to good yields of wheat, oats and barley. Potatoes and pastures have been helped by the showers.

The August 1st reports of crop correspondents show the following averages of the unharvested crops: Corn, 80.5 per cent; millet, 93; flax, 84.5; buckwheat, acreage 96 and condition 92; broom corn, 83; sorghum, 88; potatoes, 74; apples, 75; grapes, 82; pastures, 92.

BULLETIN NO. 20, AUGUST 17TH.

The week has been cool and the rainfall deficient in the larger part of the state.

The average daily deficiency in temperature ranged from 2° to 4°. There was more than the usual amount of sunshine, however, which made the days sufficiently warm to promote the ripening of crops.

The west and southwest districts received the larger quantities of rainfall, and some of it came in sections where the need of moisture was greatest. But the bulk of the state needs a good soaking rain, followed by warm weather, to bring forward the belated corn and potatoes and revive the pastures.

The cornfields in the northern half of the state are not as yet suffering materially from lack of moisture; they show a deep, green color, and no signs of being "fired." Some of the early fields in that section would ripen without more rainfall. But the late planted fields in all sections need more moisture, and warm weather till October 1st, and some more warmth after that to ripen up thoroughly.

Potatoes and pastures need more rain, in copious supplies. The outlook for the potato crop is very unpromising.

Threshing is in progress, and more than the usual amount of grain has been stacked.

BULLETIN NO. 21, AUGUST 24TH.

The week was unseasonably cold, the average daily temperature being 8° to 10° below the normal. Some of the days were warm and bright, but the temperature fell threateningly at nightfall, and on the early morning of the 20th it dropped to the frost line in numerous localities, but no damage resulted beyond retarding the ripening crops.

The prevailing drouthy condition was mitigated by showers in small portions of the state, but rain is much needed for grass, potatoes, late corn, and to put the soil in condition for fall plowing.

Corn is doing as well as could be expected under present conditions. In sections where the drouth has been most severe the dry, upland fields are badly "fired," the stalks are dwarfed, and the general condition of the crop is poor. The early planted corn is generally in full roasting ear, and most of it will reach fair maturity by the 20th of September, with normal weather. But the balance, comprising 50 to 60 per cent of the acreage planted, needs rain, followed by warm, ripening weather throughout the month of September; and at the best it will fall materially short of an average crop. The situation is critical, but with a normal September the bulk of what has been grown may be secured.

A fair start has been made in fall plowing, and harvesting wild hay is in progress.

BULLETIN NO. 22, AUGUST 31ST.

The average temperature of the week was about normal, the days being bright and warm and the nights cool. The rainfall was deficient, except in a few localities, and the drouth is unbroken over the larger part of the state; the central and southern districts have suffered the worst effects of the prevailing dry weather.

The effect upon the corn crop has been to hasten the ripening of early planting, and check the growth of late corn, which needs both warmth and moisture for its normal development. On dry uplands the leaves are being fired, and the yield will be materially reduced. In a few localities the early planted fields are being cut to secure the fodder in the best condition. With the present weather conditions about 50 per cent of the crop will be fairly ripened, and safe from damage by frost, by September 20th; the balance will need all of September to mature, with normal weather.

Pastures are becoming dry, and the drouth is damaging to late potatoes.

BULLETIN NO. 23, SEPTEMBER 7TH.

The past week brought a notable change from the cool weather prevalent through the larger part of August. At the central station, since the 31st, the daily temperature has been 13° above the seasonable average, the maximum on five successive days ranging from 96° to 98°, and at some other stations 100° were registered. It has broken the record of high temperatures in the month of September in this section. And during this period brisk southerly winds prevailed with a very low percentage of humidity.

In the larger part of the state there was but little more than a trace of rainfall; local showers of considerable severity, with high winds, visited portions of the east central, northeast and north central districts, affording partial relief from the prevalent drouth.

The effects of the hot, dry winds are noted in all sections. The further development of belated corn has been checked, and its chief value will be in the fodder that may be secured. Much of the early planted corn which, with normal temperature and moisture, would have required from two to four weeks to ripen in the best condition, has been swiftly hurried to maturity. It remains to be seen how much shrinkage will be caused by this sudden transformation from milk and dough to the hardened, dented stage of ripeness. But unquestionably it would be materially better in quality of grain to ripen more slowly, under normal conditions.

It is better thus, however, than the opposite extreme. By excessive heat and dryness much of the corn crop has been saved from the destructive effects of a killing frost; "Saved, yet so as by fire." And those who cut their corn will thereby secure the larger measure of the feeding value of the crop.

The drouth has seriously affected the potato crop and pastures, and in some sections cattle are being fed from the forage reserves.

BULLETIN NO. 24, SEPTEMBER 14TH.

The weather conditions of the preceding week were continued through the past seven days, with slight mitigation by scattered showers on the 10th and 11th insts. Twelve consecutive days with maximum temperature about 90° in the larger part of the state, make a new record for September in this region. This average daily excess of 12° to 14°, intensified by brisk to high south winds, a low percentage of humidity, and general absence of rainfall, has swiftly ripened the larger portion of early planted corn, but with some detriment to its quality. The late corn on dry upland has been dried up and made worthless except for fodder. A portion of the belated crop, on deep rich soil, and well cultivated, is still growing and will mature under normal conditions within the coming two weeks. Unquestionably the abnormal heat and drouth have materially shortened the possible yield of corn, which at the outset was deficient in stand.

The drouth has been especially damaging to pasturage and the potato crop. Plowing and fall seeding have been greatly retarded.

BULLETIN NO 25, SEPTEMBER 21ST.

The first half of the week ending the 20th was excessively warm, and the latter part much cooler than usual, making an average slightly above normal. Frosts were noted in the northern districts on the mornings of the 17th and 18th; and a severe frost occurred on the morning of the 20th in all districts.

The extent of damage resulting from these frosts cannot be estimated at this time; it is probable that late corn, potatoes and garden vegetables have been extensively cut down in all exposed localities.

Most of the corn, however, was beyond danger of harm, and it is probable that not more than 10 per cent of the crop was in condition to be materially injured by the frosts that have thus far visited the state.

The severe drouth was broken by copious showers well distributed over the state except portions of the western districts.

Plowing has been resumed and pastures are greatly benefited by the rains.

The dry weather and hot winds of the first half of September damaged winter apples quite extensively.

BULLETIN NO. 26, SEPTEMBER 28TH.

The past week has been dry, slightly warmer than usual, and almost wholly cloudless throughout the state. It has been ideal weather for ripening and drying out the corn crop, which will be in condition for the crib within ten days, if dry weather is protracted.

Variable reports are received as to the damaging effect of the recent severe frosts on the late planted corn. The extent of injury will be more clearly revealed by the scales, after the crop is harvested. There can be no question, however, of the statement that the crop would have been sounder and better in quality if it had ripened under normal conditions.

As a whole the corn crop is remarkably large and sound in view of the fact that the season was exceedingly unfavorable during the time of planting and cultivating, and since that time the temperature has been fitful and intermittent. Probably 60 per cent of the total yield will be sound and merchantable, and the balance will possess considerable feeding value. The round-up of the season will show that the soil products of the state have been abundant and greatly in excess of home requirements.

The dry weather has greatly reduced pasturage, and necessitated early feeding of stock. It has also retarded plowing and seeding of fall grain.

LOCAL CLIMATIC CHANGES.

MONTHLY REVIEW U. S. WEATHER BUREAU.

A correspondent in Northfield, Mass., desires our opinion on the question: "Were the winters of fifty years ago much colder, or were the snowfalls deeper than at present? The opinion is widely held that the winters were colder and the snowfalls deeper, but I can find nothing to warrant the belief except that in the first part of the century a much larger percentage of the population lived in the hill towns or in the interior, which are both colder than the valley or the coast towns."

On the general question as to the appreciable changes in climate the editor's opinion is that there has been no such change in any respect whatever so far as meteorology proper is concerned If we divide our records of the weather recorded in North America since the days of Columbus, into two periods, viz., before and after the year 1800, we shall find that every peculiarity, such as remarkable storms, winds, rains, floods, frosts, etc., recorded in the current century, can be matched by a corresponding remarkable event before the year 1800. The popular impressions alluded to by our correspondent result almost entirely from the imperfections of our records and especially of our memories. There is a large class of persons whose habits of thought are so crude that when they experience any very remarkable weather they jump to the conclusion that the climate has changed, forgetting that they themselves have had such a limited personal experience that they are not fair judges of the weather over the whole country or of the climate of a century.

Our correspondent seems to suggest that a certain change in the habits of the people, such as the removal from the interior to the coast, or from forests to prairies, or from country to city, or *vice versa*, will partly account for widespread errors in respect to climate. The suggestion is excellent, but the editor would be inclined to interpret the phenomenon somewhat differently. The general movement of the population in the past century has been from the Atlantic states westward, and from the country to the city, or quite opposite to the movement suggested by our correspondent. In fact, we find no real agreement in the so-called popular traditions with regard to the weather. We have met with quite as many persons who think the winters are more severe as with those who think the winters are less severe than formerly. Everything seems to depend upon how and where the "oldest inhabitant" lived when he was a boy as compared with his present condition. If he moved from a farm on a windy hilltop in the country down to a cosy house in the village, the climate seemed to him to have improved. If he moved from the milder climates on the coast in his youth to the severer climates in the interior he was, as a boy, struck with the great change, and the impression still remains with him that those winters were severer than now. If he has lived continuously in a large city like New York, where the growth of tall houses, the increased smoke, and diminished sunshine have completely changed the climate, and where these combined with the changes in the mode of living, especially the abolition of the open wood fire, have rendered the human system vastly more sensitive, he finds that the inequalities of climate are greater than formerly.

From a hygienic point of view "the climate" includes everything that affects the health and comfort of the body. The meteorological climate that agrees perfectly with one person may be entirely too severe for another. Our remembrance of our physical sensations is not a safe criterion when judging of climate. Our remembrance of an occasional storm or winter is not a safe guide in comparing the past with the present. Our records of deep snows are too fragmentary to give anything more than a general conviction that there has been no material change in the snowfall.

Our records of extreme low temperatures are liable to be in error several degrees by the ancient use of very imperfect thermometers, and are almost certain to be exaggerated if the thermometers were placed in valleys or lowlands where cold air settles on still, clear nights, so that we must use great caution in interpreting these records; differences of 5°, 10°, and even 20° have occurred between the minimum temperatures recorded by weather bureau and voluntary observers located within a few miles of each, owing to the combination of these two sources of error.

Remarkable rains and snows are usually quite local phenomena; there have been several remarkable cases of this nature in certain portions of New England and the middle Atlantic states within the past ten years. Similar remarkable cases occurred in other portions of these states fifty years ago, and equally remarkable cases occurred in still other portions just before 1800 If there has been any change in the climate of Northfield, Mass., it is because it lay within some one of these regions of extraordinary rain or snow on one occasion and not on another. Such a change of climate at one spot is no criterion by which to judge of changes at other places 100 miles away. The average climate of New England, so far as the weather is concerned, has not appreciably changed since the days when her oldest forest trees were young saplings, and that carries us back nearly 500 years.

THE FORMATION OF DEW.

The following extract is from an article written by Dr. J. G. McPherson, lecturer on meteorology in the University of St. Andrews, published in the Wakefield (Eng.) *Express:*

Whence comes the dew? It does not fall from the air. Whence comes it, then? We shall see. Ground a little below the surface is always warmer than the air over it. As long, then, as the surface of the ground is above the dew point, vapor must rise and pass from the land into the air. The moist air so formed will mingle with the air above it, and its moisture will be condensed, forming dew wherever it comes in contact with a surface cooled below the dew point. In fact, dew rises from the ground.

Place some metal trays over the grass, the soil, and the road on dewy nights. You will generally find more moisture on the grass inside the trays than outside; you will always observe a deposit of dew inside the trays, even when there is none outside at all. This shows that far more vapor rises out of the ground during the night than condenses as dew on the grass and other objects.

Pieces of iron lying on grass are soon surrounded with richer grass, on account of the moisture which the cold metal attracts from the rising water-vapor. Travelers in Australia and South Africa state that they often found the under side of their bedding placed on the ground to be wet after camping out at night. I remember, when walking in the vicinity of Hexham with an acute observer, trained to farming, that, on my remarking that the farmers might to their profit remove the extraordinary quantity of small stones from the fields in order to give room for the growth of the grain, he shrewdly said: "These stones collect moisture from the ground;

the soil is thin, with a gravelly subsoil, and unless the maximum amount of moisture be collected (which can only be done by allowing these stones to remain), there would be a very deficient crop. They must not, therefore, be removed."

Dew, then, rises from the ground. But how is the dew formed on bodies high up in the air? If the dew comes out of the ground, should it not be found on bodies only exposed to the earth? Now dew does not rise in particles, as it was once considered to fall in particles like fine rain. It rises in vapor. Some is caught by what is on the surface of the earth, but the rest ascends in vapor form until it comes in contact with a much colder surface, to condense it into moisture. The vapor does not flow upward in a uniform stream, but is mixed in the air by eddies and wind currents, and carried to bodies far from where it rose. In fact, dew may be deposited, even though the country for many miles all around be dry and incapable of yielding any vapor. In such cases the supply of vapor to form that dew would depend on the evaporation of the dew, and on what was wafted over by the winds.

But the most practically convincing proof of the rising of dew from the ground is in the form of hoar frost or frozen dew. If it has been a bright, clear, sunny day in January, with no snow on the ground, look over the garden, grass and walks on the morning after the intense cold of the night: big leaves may be found scattered over the place. You see little or no hoar frost on the upper surface of the leaves, but turn up the surfrce next the earth, or the road, or the grass, and what will you see? You have only to handle the leaf in this way to be highly astonished. A thick, white coating of hoar frost, as thick as a layer of snow, is on the under surface. Leaf after leaf will present the same appearance. If a number of leaves have been overlapping each other, then there will be no coating under the top leaves; but when you reach the lowest layer, next the bare ground, you will find the hoar frost on the under surface of the leaves. Now that is positive proof that the hoar frost has not fallen from the air, but has risen from the earth. And hoar frost is, as we have said, frozen dew.

Dew, then, mostly rises from the ground, and what used to be thought dew is the active exudation of the healthy grass. These two facts are now established. Brilliant globules are produced by the vital action of the plant, showing life in one of the most charming forms in the phenomena of nature.

VALUE OF LONG CONTINUED METEOROLOGICAL RECORDS.

Great interest attaches to a long continued meteorological record by any one observer. A station whose record runs back twenty-five years becomes a medium of comparison for all the surrounding territory, and one of fifty years establishes the normal values for that section of country. On the other hand, one must be careful not to draw too many fine conclusions from any one such record, for in the course of fifty years barometers deteriorate and thermometers change their scale of corrections, to say nothing of the breakages and renewals that will happen to every instrument. Even the simple rain gauge is liable to be changed, and especially do its records suffer from the fact that the growth of trees and shrubbery, the erection of buildings, and possible changes of location, such as are almost sure to be made when the observer thinks he can improve the exposure—all contribute greatly to change the catch of the rain gauge. These inevitable changes increase the difficulty of ascertaining whether there has been any secular variation in climate. Such variation, if any, is certainly always very small and usually far less important than the variations due to the changes in instruments and their exposures. Although, therefore, the continuity of a record by one observer at the same station for a long period is partially broken up by these changes, still there is always a feeling that his ancient and his recent records are more comparable among themselves than would be the case with records made by different observers at different locations in his neighborhood. There is, moreover, a great advantage in having long records of cloudiness, direction and force of wind, the number of rainy days, the direction of the clouds, frequency of thunderstorms and auroras, and other miscellaneous phenomena not generally recorded by means of instruments and in reference to which the habits are, therefore, most important. * * * It would be a valuable contribution to climatology if our voluntary observers and the directors of the state weather services would acquaint themselves with the locations in their neighborhood where temperature and rainfall records have been previously kept and would stimulate or provide for the renewal of those records for a period of time long enough to establish clearly the relation between the climates at those spots and at the neighboring locations where records are kept. —*Monthly Weather Review, U. S. Weather Bureau.*

CLIMATE AND HEALTH.

Under this heading some of the aspects of medical climatology are discussed by Dr. Charles Fayette Taylor in the *Popular Science Monthly* for July, 1895.

Change of climate and its attendant circumstances, even when not of any extreme character or degree, do produce an impression, more or less profound, on the vital processes, and physicians, when consulted, should have some definite advice to give in regard to locations best suited to the inquirer's special needs, or, at least, ought to be able to give their patients some very positive ideas as to the kind of climate to seek, and especially what to avoid. For instance, California is 770 miles long and embraces a number of distinctly different climates. What, then, is the use of telling a patient with a hole in the top of his lungs to "go to California," without telling him where to locate, where he should go, or what kind of a climate he should look for? To know the mean temperature of a place, and to know only that, is to know very little about its climate.

The physiologic effects of climate include the degrees of humidity, the force and direction of the prevailing winds, the sunshine, cloudiness and fogs and other unmeasurable influences, not seen, though felt.

The thermometer in the interior valleys of California has been seen to indicate 100° to 110° for days together, and no one complained of the heat as excessive and heat prostrations were unknown. In New York, when the summer heat approaches 90°, prostrations occur and sometimes deaths. This is not to show that 110° heat in California, with no prostrations, is a better climate than New York, with 90° and many prostrations, but to illustrate the principle that we must know more about climate than what the thermometer can tell us. From the fact that fewer microbes were found in the dry air of high altitudes it must not be too hastily concluded that the higher and drier locality was essentially more healthful than the lower and moister locality, even for consumption, until we know the quality and energy of other meteorologic influences. People in those high regions have a thin and tired look, and it is found useful and often necessary to visit the lower and damper localities in order to recuperate.

It seems that climatology has heretofore, to a large extent, resolved itself into a search for some place where consumptives can not die. There is no such place. There is no climate where the ever-present bacillus may not get in its deadly work

The chief question in climatology in its relations to health should be: "In what climate, or by what changes and influences of different climates, can we be best invigorated for good existence in the location where we are obliged to live the greater portion of our lives?" It is amazing to see people, intelligent about ordinary things, traveling for their health at a rate that suggests that they have been shot out of a gun. Some do, of course, find limited benefit, but often mistake change of feeling due to excitement for recuperation. Instead of rushing across the face of the earth in the delusive hope of finding health on the other side, we need to learn how to sit down and make ourselves comfortable where we are. A protest is entered against the practice of sending patients, often far gone with consumption or other diseases, away from friends and comforts of home, without knowledge of what would be the best for them, in a fruitless search for health, when in their enfeebled states better conditions could be instituted at home, where at least they could die in peace. When the medical profession fully realizes the immense value of climate in therapeutics a climatotherapy may be formulated which shall be of great value to the healing art.

THE CHINCH BUG.

DAVID H. CARR, U. S. WEATHER BUREAU, MILWAUKEE, WIS

This insect, known to scientists as the *Blissus Leucopterus*, first made its appearance in North America in 1783, and at that time was thought to be a species of the Hessian fly, which had first made its appearance in this county a short time before. When full grown the chinch bug is about one-seventh of an inch in length; black, with white upper wings marked by two well-defined black spots. The young vary in color from a pale yellow to a bright red and the pupa is reddish brown and wingless. The female deposits her eggs under the ground in clusters near or upon the stems or roots of wheat, corn, oats or grasses. Sometimes on pulling up a wheat plant hundreds of eggs may be seen adhering to the roots, where the mother insect has placed them The young remain in or near the earth, sucking the sap from the stems or roots of the plant. It is while in the larval state that these insects do most damage, sometimes destroying half the crops of a district. After maturing they ascend the stalks of the plants and infest the stalks and leaves in great numbers, generally during the early part of June. Fortunately the larva is killed by moisture, so that a rainy season is of great benefit in destroying them before they are sufficiently matured to produce young in their turn. In drouths, however, the chinch bug increases with fearful rapidity, and although the insect feeds chiefly upon wheat, it does not disdain other vegetation, and in fact, as an aggrieved farmer said, "nothing comes amiss to it." It seems, however, to prefer wheat, corn, barley, oats and grasses in the order named. It has no mandibles, but is equipped with a tiny apparatus for piercing the stalks and leaves, and sucks out the juice, thus destroying the plant in a short time. The insects sometimes appear in armies, moving in solid columns from field to field, traveling along the ground and destroying nearly everything in their path. It is owing to the fact that while on these migrations the chinch bug makes very little use of its wings that it has been classed in the *Hemitera* or half-winged order, in which the metamorphosis from the wingless to the winged state is incomplete. The chinch bug hibernates during the winter, hidden away within the leaf sheaths of cornstalks in shocks of corn, in the crevices of fences, or under the shelter of any kind of rubbish affording protection from the rain. This insect is not affected by cold, instances being known where it was found frozen, and on being thawed out immediately resumed its activity. It quickly succumbs to moisture, however, and where irrigation is practiced, flooding fields for several days in succession will generally dispose of the pests. Two broods of these insects appear in this section of the country during the season, the first in June and the second in autumn. The disgusting bedbug-like odor of both the young and the adult insects appears to protect them from most insect-eating birds and predaceous insects. They are, however, eaten to some extent by the quail and probably by a few other birds; among insects, the lady-bird beetle destroys them in considerable numbers. They are also subject to attacks of bacterial diseases, which are the most potent factors in reducing their numbers.

Following are several suggestions which have proven practicable in dealing with these pests:

All rubbish accumulated along fences and headlands should be hauled into the fields in the autumn and burned. Spraying with kerosene emulsion, using the force pump and cyclone nozzle, kills the bugs without injury to the crops and is undoubtedly the best remedy in the hands of the farmer. Infested grass and grain lands should be burned over during the fall and winter and all rubbish destroyed that offers protection from the rain. If piles of straw are left at convenient places and burned during the winter the result will be a decided decrease in the number of chinch bugs. It is also a good plan to burn the stubble, old straw, and weeds in fence corners in the early spring. When on migrations their progress may be checked by spreading a thin layer of coal tar across their path.

In the future serious depredations by the chinch bug will be prevented by propagating among them the bacterial forms of disease peculiar to the species, which spread very rapidly among them and under which they quickly succumb.

THE ORIGIN OF THE WEATHER BUREAU.

PROF. CLEVELAND ABBE.

The writer well remembers the day when, as a youth, over forty years ago, he visited Merriam, "the Sage of Brooklyn Heights," whose publications had awakened his attention to the possibility of publishing reliable daily weather predictions.

In those days the New York evening papers printed a daily weather bulletin, furnished by the enterprise of the telegraph companies, which gave the temperature, wind and weather for some early morning hour at a large number of stations scattered over the whole country. Had these items been displayed graphically upon a map of the country, it would have been possible to practice daily forecasting for New York; but as this was not done by the newspapers, the readers picked out only a few interesting temperatures as items of news, and never realized how nearly they had in their grasp the power of predicting the weather. But I suspect that this daily charting is precisely what Merriam may have privately done, and on which he may have based his occasional public predictions of "heated terms" and "cold terms."

If those telegrams had contained the readings of the barometer in addition to the other items, and if Merriam had charted them, as Espy and Henry were then doing, he would undoubtedly have been able to add also the prediction of storm winds and rain. If Merriam's manuscripts are still in existence, they would afford valuable material for a history of meteorology in America. An old scrapbook of mine, begun in the year 1851, still reminds me of my vivid interest in the prediction of the weather by rational methods. It was not until ten years later that I realized that this daily telegraphic bulletin in the New York newspapers was directly due to Prof. Joseph Henry, who in 1849 had asked that these weather items be telegraphed for the use of the Smithsonian Institution, in order that he and Espy might study the origin, development and progress of American storms. From 1842 to 1857 James P. Espy was the official meteorologist of the United States, and carried on his work in co-operation with the army, the navy and the Smithsonian.

No man ever had a broader appreciation of science for its own sake, and also of science as a means of benefiting mankind, than Prof. Joseph Henry, the noble-hearted first secretary and organizer of the Smithsonian. His natural gifts and his scientific researches were well known before he was elevated to this position, of whose duties and responsibilities he entertained the most exalted conception, and to which he was faithful to the last

There is scarcely a branch of practical or applied science that he was not able to advance; among these telegraphy and meteorology, with their applications to the benefit of mankind, stand pre-eminent. In 1848, Redfield, of New York; Loomis, then of the Western Reserve college at Hudson, Ohio, and Espy, of Philadelphia, were the leaders in the study of storms.

Henry was the friend of all, and indorsed and advanced their views. The telegraph companies, recognizing and acknowledging their indebtedness to him for his discoveries and inventions in electrical matters, granted him freely those daily weather dispatches that he asked for and which enabled him to be the first to demonstrate systematically the truth that Redfield, Espy and Loomis had long maintained; *i. e.*, that through the telegraph, although then in its infancy, we had the power to predict the coming storms. The Morse telegraph line was open for public business in April, 1845, and in 1846 Redfield published his conviction of the probable value of the telegraph and the daily chart; it is on record that merchants in New York, Boston and Cincinnati, in their individual capacities, were often guided by weather reports telegraphed from a few neighboring stations. But systematic and public work for the benefit of all was the object that Henry had in view. To this end a daily telegraph bulletin was compiled at his request, and was communicated both to the Smithsonian and to the daily press. To this end he immediately displayed this same data daily on a map at the Smithsonian institution. To this end he constantly interviewed members of congress as to the propriety and the necessity of a public weather service, illustrating his talk by actual predictions for Washington. To this end, finally, in 1864, he was preparing to revive his map, which had been temperarily discontinued during the war, when a disastrous fire in the Smithsonian building checked all further work in this direction. But Henry's agitation of the importance of the subject did not cease, as is shown by the testimony of several members of congress whom he interested in the subject. Meanwhile, England, Holland and France had awakened to the possibilities of the case.

Owing to the labor of Espy, Redfield, Loomis and Henry, there was widespread throughout this country a conviction that something useful could be done in the way of weather predictions. When the writer proposed the subject in May, 1868, first to the trustees of the Cincinnati observatory, then to Mr. John A. Gano, as editor of the Cincinnati Commercial, subsequently again to him as president of the chamber of commerce, there was an immediate response to the effect that "this is what we have long been doing for our individual business interests and will be glad to have you do for the city as a whole." When, in August, 1869, on behalf of Cincinnati, he made a similar proposition to the Chicago board of trade, looking to co-operation, there was a temporary difficulty in accepting it; but an editorial in the Chicago Evening Journal called public attention to the nature and importance of the work, and the weather bulletin of the Cincinnati observatory began September 1, 1869. When in December, 1869, Prof. I. A. Lapham's memorial to the academy of sciences was, by the Hon. E. D. Holton, converted into a memorial to the national board of trade, and by the Hon. H. E. Paine into a memorial to the senate and house of representatives at Washington, there was from each an immediate favorable response. Professor Henry was at hand to say that from a scientific point of view the scheme was thoroughly sound; the representatives from Ohio were at hand to say that the work was being successfully done in Cincinnati; General Myer was on hand to say that the army signal corps were ready to carry out the practical part of the great national work. Thus Mr. Paine's bill was rapidly forwarded through the various stages of legislation, and the act of February 4, 1870, accomplished the great object that had been held steadily in view for forty years by Henry and his co-laborers—a national weather bureau was established; another department of science was recognized as of eminent utility.

During the past twenty-seven years the American public, and for that matter the world at large, has with increasing admiration viewed the energy, the accuracy and the practical value of the work of the weather bureau. Those who admire climatology as well as those theoretical students who deal with the difficult mechanical problems involved in meteorology have sometimes felt that the bureau pays too little attention to scientific investigations, and that many nice points are lost sight of in the breadth of the work and the rapidity of execution that has always been imposed on us by the public and by our successive chiefs.

But, whatever reason there may have been for this criticism, it is likely to be removed if the plans of our present chief are allowed to come to full fruition. The fact is that the meteorology, considered as the scientific study of the laws of atmospheric phenomena, is not yet in a perfectly satisfactory position. This is not to be wondered at when we recall that, in 1870, Ferrel was the only man who possessed clear views of the mechanical problems involved in the movements of the winds.

His work was broad and general, and it was necessary to collect more facts before attempting any future developments in unraveling the mechanics of the atmosphere. Since those days our knowledge of the laws of mechanics and thermodynamics, as applied to the air, have been advanced by the study of skillful mathematicians and physicists. Simultaneously with their work, the publication of daily weather charts, and the exploration of the air by means of high mountain observatories and by balloons and kites and the spectroscope, has given us such a solid observational basis that we can now begin to handle the problems of nature in a manner that promises partially to satisfy the demands of exact science.

If our universities would give dynamic meteorology a prominent place in their courses of study, it would greatly facilitate our future progress and the developement of a new race of students. In the matter of observations the most desirable improvement is the invention of some method by which to ascertain the actual condition of the air as to pressure, temperature and moisture at a considerable height above the ground. When Professor Moore shall be able to realize his ideal of obtaining, at any moment, the wind and temperature from any altitude up to two miles by means of kites or other devices, we hope to have a satisfactory solution of this problem, and shall be able to apply the recent development of mechanical ideas to comprehensive studies of atmosphere.

PRECIPITATION DATA.

Average monthly and annual precipitation (rain or melted snow) at various Iowa stations for the period of years named.

STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	No. years.	Record is included between dates below.
Albion	.91	1.89	2.17	2.04	4.18	5.11	4.54	3.02	4.40	3.17	1.84	1.18	34.45	6	1879-1894
Algona	.66	.74	1.66	4.19	3.19	3.41	2.37	2.35	1.92	1.45	1.01	1.45	24.40	6	1892-1897
Amana	1.52	1.28	1.97	2.93	4.21	4.56	4.18	3.44	3.34	2.63	1.77	1.48	33.31	23	1875-1897
Ames	1.07	.98	1.42	2.91	4.02	4.36	4.61	3.40	3.52	2.21	1.22	.99	30.65	23	1875-1897
Alta	.80	.74	1.95	4.19	4.12	5.64	3.78	3.51	2.15	2.17	.95	1.08	31.08	7	1891-1897
Atlantic	.67	.88	1.83	3.68	4.28	5.44	3.71	2.95	2.81	2.20	.70	1.41	30.56	7	1891-1897
Audubon	.64	.84	1.92	4.56	3.39	3.37	3.13	3.54	3.32	1.79	1.77	1.13	29.40	5	1893-1897
Blakeville	2.23	1.58	2.07	2.54	5.35	6.19	3.74	3.47	1.94	4.30	1.76	3.46	38.63	4	1890-1893
Belle Plaine	1.53	1.10	2.08	3.45	3.86	3.53	3.30	2.43	2.88	2.34	1.60	1.47	29.57	8	1890-1897
Bonaparte	1.79	1.02	2.51	3.81	3.70	3.61	3.83	2.78	3.98	1.20	2.02	1.83	32.08	7	1891-1897
Brookside	1.43	1.67	2.43	2.99	4.82	5.78	5.97	5.29	4.60	3.62	2.24	1.36	42.20	16	1862-1879
Brookville	1.26	1.26	1.99	3.06	3.83	4.97	2.82	3.39	3.00	2.95	1.77	1.62	31.92	11	1876-1888
Carroll	1.23	1.08	2.54	4.15	4.30	4.32	3.30	2.84	1.87	2.57	1.06	1.04	30.30	8	1890-1897
Cedar Falls	1.09	.94	1.43	3.72	4.77	3.58	4.82	2.65	3.17	2.26	1.29	1.32	31.04	7	1891-1897
Cedar Rapids	1.64	1.54	2.80	3.20	4.55	3.93	3.02	2.88	2.93	2.65	1.55	1.70	31.79	16	1882-1897
Centerville	1.48	1.18	1.95	5.02	2.98	3.58	5.88	3.13	2.36	.83	1.52	3.12	33.03	5	1892-1897
Charles City	1.37	1.13	1.56	3.61	3.68	5.26	2.74	2.88	2.44	1.72	1.32	1.62	28.83	7	1891-1897
Clarinda	1.06	.93	1.83	3.42	4.52	5.31	4.31	3.62	1.68	1.78	.88	1.20	30.54	8	1890-1897
Clinton	1.94	1.59	2.18	3.14	4.09	4.32	3.54	2.06	3.01	1.25	2.07	1.29	30.48	7	1891-1897
College Springs	.50	.89	1.88	4.31	4.51	4.45	5.75	2.82	1.96	2.61	.80	1.59	32.07	7	1891-1897
Corning	.70	.76	1.87	3.87	4.74	4.20	4.32	3.33	2.09	2.50	.84	1.07	29.29	6	1892-1897
Cresco	1.29	.93	1.31	2.58	3.60	5.27	3.94	2.95	3.71	2.29	1.42	1.33	30.62	27	1871-1897
Davenport	1.78	1.62	2.22	2.95	4.39	4.36	3.86	3.59	3.27	2.59	2.07	1.37	34.07	26	1871-1897
Delaware	1.19	.74	1.77	3.04	3.98	4.09	3.56	2.94	3.34	2.08	1.77	1.81	30.31	7	1891-1897
Decorah	1.37	.60	1.20	3.50	3.04	4.72	2.26	1.26	3.15	2.15	1.43	1.45	26.13	5	1893-1897
Denmark	1.46	1.98	2.33	2.53	4.47	5.85	3.33	3.52	2.80	3.82	1.87	1.94	35.89	12	....
Des Moines	1.34	1.28	1.61	3.06	4.67	5.10	3.84	3.30	3.14	2.92	1.55	1.43	32.98	20	1878-1897
Dubuque	1.68	1.48	2.24	3.02	4.06	4.99	4.42	3.04	4.15	2.63	2.04	1.81	35.56	25	1873-1897
Dysart	1.23	1.18	1.74	2.22	3.92	4.96	4.75	3.80	4.75	3.08	1.75	1.68	35.06	13	1877-1889
Elkader	1.58	1.10	1.73	2.98	3.74	3.94	4.14	2.98	3.98	2.68	1.71	2.28	32.69	19	1879-1897
Fairfield	1.61	1.41	2.06	3.03	6.01	4.30	3.24	3.63	2.71	2.60	1.99	1.73	34.83	13	1879-1897
Fayette	1.41	.92	2.06	3.59	4.06	6.42	3.00	3.61	2.95	2.61	1.68	1.63	33.94	8	1890-1897

PRECIPITATION DATA—CONTINUED.

STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.	No. years.	Record is included between dates below.
Garnavillo	1.03	1.11	1.28	2.00	3.25	3.72	5.27	3.29	4.55	3.21	1.08	1.06	30.85	7	1880-1886
Galva	.49	.31	1.38	3.94	3.07	3.76	3.42	2.90	2.05	1.14	1.04	.87	24.37	5	1893-1897
Glenwood	.84	.75	1.38	2.50	5.21	4.46	3.56	3.52	2.18	2.44	.92	.85	28.61	14	1875-1897
Grand Meadow	1.54	.90	2.00	3.69	4.14	5.56	3.59	2.47	3.02	2.24	1.52	1.76	32.43	7	1891-1897
Greenfield	1.02	1.08	2.51	3.84	4.23	4.17	4.70	2.81	3.11	1.61	.95	1.60	31.63	7	1891-1897
Grinnell	1.19	.77	2.00	3.66	4.60	5.08	2.87	3.82	2.03	2.14	1.49	1.37	31.02	8	1890-1897
Grundy Center	.58	.69	1.37	4.30	4.24	3.60	4.11	2.74	2.79	2.33	.98	1.40	29.13	7	1891-1897
Guttenburg	1.14	1.17	1.88	2.33	3.55	5.17	4.62	3.61	3.87	2.34	2.01	1.89	33.58	16	1865-1885
Hamlin	.57	.56	.85	1.56	3.31	3.49	3.84	2.38	2.55	2.59	.85	.84	23.39	12	1877-1888
Hampton	1.25	1.12	1.96	4.36	3.70	4.97	3.56	2.74	2.84	2.50	1.70	1.46	32.16	8	1890-1897
Hawkeye	1.95	1.24	2.25	3.12	3.56	4.61	2.38	2.55	2.67	1.46	1.46	1.72	28.97	5	1893-1897
Hopeville	2.43	.84	1.75	4.14	4.66	3.93	4.45	3.11	2.95	1.67	.90	1.13	31.96	7	1891-1897
Hopkinton	1.58	1.30	1.99	2.63	4.25	1.20	3.67	3.97	4.68	3.56	2.09	1.88	32.80	18	1877-1895
Humboldt	.56	.48	1.47	4.64	3.36	3.20	3.53	2.20	2.18	1.59	.90	.72	24.83	5	1893-1897
Ida Grove	.82	1.00	.84	1.64	3.85	5.14	3.71	3.14	3.84	2.70	1.00	.94	28.62	7	1879-1887
Independence	1.28	1.03	1.74	2.46	4.01	4.80	4.38	3.16	4.36	2.30	1.41	1.41	32.34	31	1867-1897
Indianola	1.17	.73	.96	3.66	4.83	4.07	3.28	3.26	2.98	1.27	.92	1.62	28.75	6	1892-1897
Iowa City	1.70	1.26	2.31	3.22	4.03	3.73	4.37	2.29	2.72	1.69	1.79	1.78	30.89	8	1890-1897
Iowa Falls	.88	.83	1.28	4.69	3.74	3.69	3.04	2.78	3.05	2.01	1.18	1.24	28.41	5	1893-1897
Keokuk	1.84	1.66	2.21	3.26	3.95	4.48	4.84	2.78	3.66	2.61	2.80	1.84	34.93	27	1871-1897
Keosauqua	1.58	1.18	2.07	4.52	4.59	3.73	3.94	2.40	4.78	1.02	1.27	1.56	32.64	6	1892-1897
Knoxville	.85	.98	1.28	4.75	2.57	3.40	3.76	4.33	3.59	2.10	1.01	1.40	30.05	5	1893-1897
Larrabee	.71	.68	1.65	3.93	3.91	6.19	3.80	3.06	1.97	2.06	.93	1.25	30.36	8	1890-1897
Logan	1.18	1.20	1.88	2.98	4.38	5.58	4.97	3.98	3.08	2.35	1.06	1.38	33.91	33	1866-1897
Marshalltown	.78	.74	1.74	3.93	4.48	3.48	4.60	2.50	2.07	2.34	.89	1.64	29.19	6	1891-1897
Maxon	.68	1.28	1.67	3.60	5.16	3.42	4.20	4.87	2.68	1.55	1.78	1.97	32.65	6	1891-1896
Maquoketa	1.65	1.81	2.35	3.22	4.02	7.37	3.34	2.46	2.54	2.76	1.68	1.92	35.12	5	1891-1897
McGregor	1.38	1.33	1.66	2.47	3.77	4.72	4.38	3.20	3.39	2.88	1.82	1.67	32.07	46	1850-1896
Mechanicsville	1.41	1.13	2.15	3.00	4.30	4.41	3.64	2.08	3.95	1.34	1.63	1.76	30.80	5	1893-1897
Monticello	1.59	1.73	2.29	2.69	3.88	4.46	4.30	3.63	3.78	2.74	2.27	2.26	35.63	43	1855-1897
Mt Ayr	.82	1.04	2.12	4.09	5.40	4.61	5.06	3.14	3.25	1.60	1.09	1.38	33.60	5	1893-1897
Mt. Vernon	2.34	.36	2.30	3.06	3.74	5.09	3.50	3.47	2.94	2.71	1.59	.68	31.68	6	1890-1897
Muscatine	1.81	2.08	2.70	3.41	4.38	4.46	3.91	4.38	3.73	3.04	2.30	2.28	38.06	43	1849-1891

Nashua	1.54	2.23	2.76	2.07	4.19	5.35	6.68	3.87	5.81	3.45	2.34	3.94	44.23	11	1878-1888
Newton	.81	.98	1.36	3.61	4.55	4.00	3.37	3.50	3.35	2.40	1.84	1.34	31.11	11	1878-1897
Onawa	2.32	1.12	1.51	2.79	4.61	5.11	4.23	4.04	2.33	2.11	1.05	1.06	31.28	17	1879-1895
Osage	1.40	1.11	1.39	2.89	4.13	4.33	3.45	2.75	3.60	2.40	1.38	1.41	30.24	11	1891-1897
Oskaloosa	.90	1.09	2.05	2.25	3.40	4.08	3.73	2.78	2.94	2.21	1.67	1.18	28.28	21	1875-1897
Ovid	1.18	1.36	2.10	3.84	3.26	3.51	2.98	3.24	3.60	1.94	1.28	1.70	30.01	5	1893-1897
Panama	.36	.55	1.29	4.08	4.09	3.83	4.56	4.18	2.77	2.34	1.08	1.16	30.24	6	1891-1896
Rock Rapids	.68	.14	1.74	4.33	2.86	3.74	2.63	1.76	2.30	1.68	.90	.61	23.46	5	1893-1897
Sac City	1.15	1.06	.69	3.41	4.16	5.15	3.82	3.28	3.16	2.23	1.17	1.28	30.56	23	1870-1897
Seymour	1.45	1.66	1.21	3.95	3.11	4.40	3.46	4.49	4.07	1.61	1.81	1.99	33.21	5	1893-1897
Sibley	.95	.33	1.34	3.99	2.95	3.74	3.08	1.83	2.82	2.03	1.12	.81	24.99	5	1893-1897
Smithland	.54	.65	.66	2.09	3.50	4.32	2.96	2.77	2.84	1.76	1.71	.63	24.43	9	1879-1887
Storm Lake	.81	.68	1.37	2.49	3.47	4.52	3.79	2.66	2.66	1.45	.78	.98	25.66	10	1884-1893
Vinton	1.26	.87	1.72	3.22	3.80	3.64	2.81	2.25	2.75	2.31	1.13	1.35	27.11	8	1890-1897
Villisca	.62	.64	2.21	4.16	3.74	5.14	5.12	4.91	2.04	1.71	.95	1.00	32.24	5	1893-1897
Washington	1.65	.98	2.20	2.70	3.40	3.30	3.76	2.33	2.64	2.39	1.52	1.35	27.22	8	1890-1897
Waterloo	1.18	1.11	1.35	2.50	3.55	3.56	4.10	3.60	4.37	2.13	1.40	1.28	30.13	19	1864-1897
Webster City	1.11	1.05	1.96	3.81	3.23	3.30	3.88	2.86	1.51	2.10	1.11	1.56	27.48	5	1891-1897
Wesley	1.14	1.05	1.41	2.30	3.30	4.74	3.50	2.79	3.52	2.17	1.13	2.16	29.21	12	1879-1890
Winterset	.92	.84	1.89	4.69	4.55	5.47	4.96	3.28	3.19	1.75	.83	1.44	33.81	7	1891-1897
Average monthly	1.21	1.07	1.81	3.34	4.01	4.44	3.89	3.11	3.08	2.23	1.43	1.50	31.12		... ..

MEAN TEMPERATURE.

Average monthly and annual mean temperature at various Iowa stations for the period of years named.

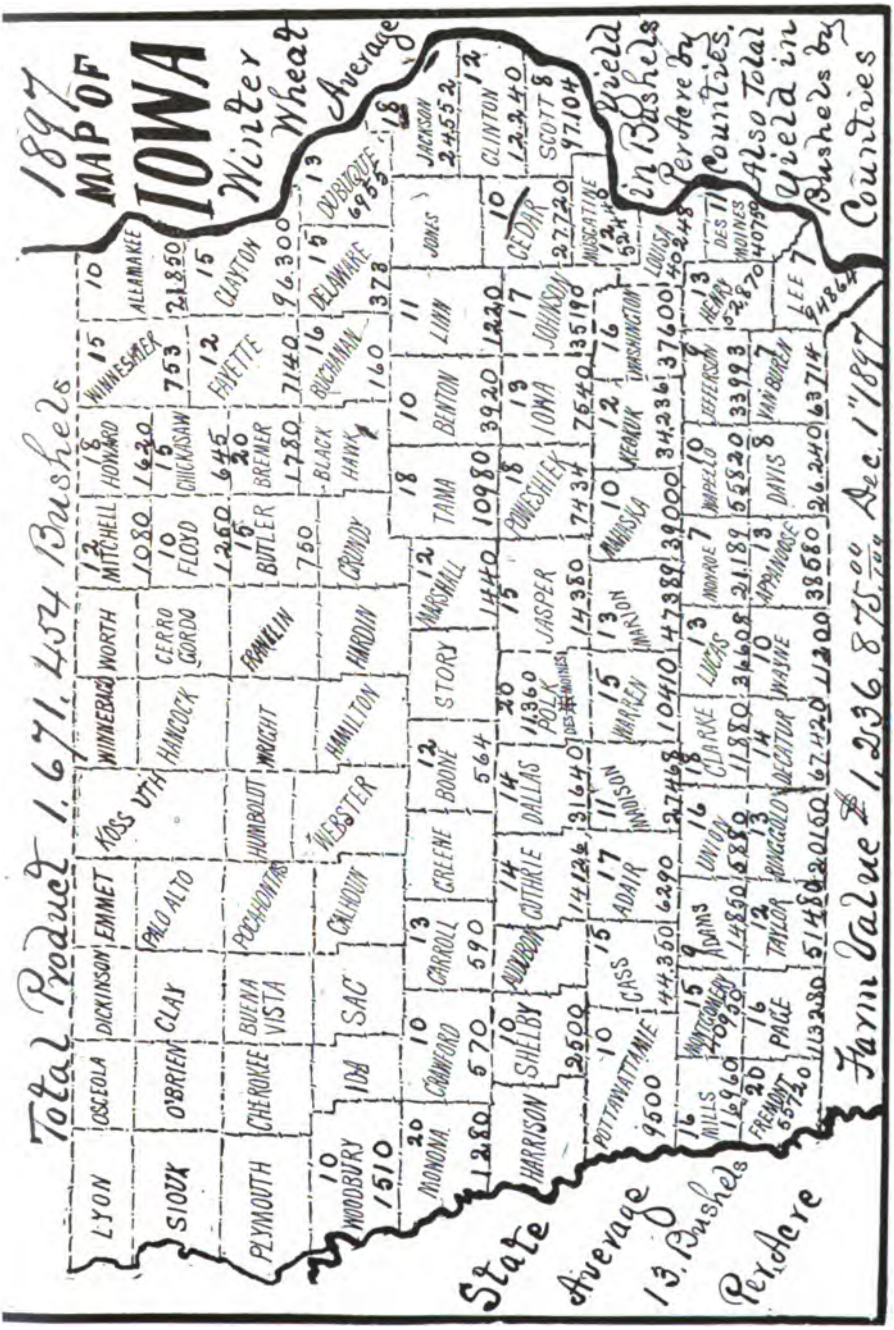
STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Means.	No. years.	Record included between dates below.
Albion	11.6	17.3	28.7	45.3	58.4	66.9	70.9	69.0	59.5	49.1	29.7	17.1	42.0	6	1879-1884
Algona	10.7	19.0	30.2	48.2	58.8	69.7	73.5	69.0	63.5	48.7	29.5	21.5	45.2	6	1891-1897
Amana	14.0	20.7	30.8	48.4	59.5	69.4	73.7	70.2	61.7	48.5	31.9	21.9	45.9	22	1876-1897
Ames	15.4	22.4	32.0	48.2	58.9	69.8	75.1	73.0	63.5	50.1	31.5	23.2	46.9	18	1876-1897
Alta	14.0	17.9	29.0	47.4	57.6	69.0	72.3	69.9	64.7	49.7	29.0	22.4	45.2	7	1891-1897
Atlantic	17.7	24.0	33.0	49.3	58.4	69.7	72.9	70.1	65.8	50.9	32.7	25.9	47.5	7	1891-1897
Audubon	17.2	20.4	33.4	50.2	59.8	69.2	73.2	71.6	64.2	49.4	32.2	25.1	47.1	5	1893-1897
Blakeville	13.7	23.0	30.0	47.5	55.8	71.2	74.5	71.5	66.3	52.3	34.3	24.5	47.0	4	1890-1893
Belle Plaine	17.6	23.6	32.2	49.6	58.8	70.0	73.0	70.0	61.1	49.4	32.4	24.6	47.0	8	1890-1897
Bonaparte	20.8	27.0	38.0	52.5	62.5	73.3	76.0	74.3	68.9	54.9	36.3	29.4	51.1	7	1891-1897
Brookside	12.7	19.9	29.1	45.1	59.0	68.6	73.4	69.9	61.0	46.6	31.4	17.5	44.5	17	1862-1878
Carroll	17.9	20.6	30.6	48.8	58.6	69.9	73.5	70.0	63.8	49.8	31.1	24.2	46.6	8	1890-1897
Cedar Falls	15.5	19.2	31.9	49.8	58.8	70.3	73.3	71.5	65.0	50.9	31.1	24.5	45.8	7	1891-1897
Cedar Rapids	16.4	21.6	32.4	48.5	59.0	70.5	74.6	71.4	63.8	50.0	31.6	25.1	46.9	16	1882-1897
Centerville	21.5	22.7	40.7	54.2	62.2	71.7	76.8	73.6	69.0	52.0	37.0	30.8	51.0	5	1893-1897
Charles City	12.5	17.1	29.7	47.1	57.2	68.5	73.7	70.5	63.6	49.4	29.1	21.6	45.0	7	1891-1897
Clarinda	20.4	24.2	34.1	53.0	60.6	71.5	75.2	72.9	66.9	53.0	35.8	28.4	49.6	8	1890-1897
Clinton	17.7	22.3	35.2	51.8	60.9	71.4	74.0	72.1	65.8	51.4	33.7	27.2	48.5	7	1891-1897
College Springs	21.6	26.2	36.8	50.6	60.2	70.3	74.4	73.0	68.4	57.0	37.8	33.8	50.8	7	1891-1897
Corning	19.5	24.7	36.2	51.3	60.2	70.0	73.4	71.5	66.3	53.5	35.8	27.0	49.1	6	1892-1897
Cresco	9.9	15.7	25.5	44.4	56.4	66.2	70.9	68.6	59.6	46.4	29.4	18.4	42.6	26	1872-1897
Davenport	20.7	25.5	34.8	50.1	61.0	70.8	75.1	73.7	64.8	52.4	33.9	27.7	49.4	26	1872-1897
Delaware	13.2	17.8	30.2	47.0	57.7	68.4	71.6	68.7	61.7	46.7	29.6	22.3	44.5	7	1891-1897
Decorah	11.0	16.8	30.8	50.3	60.0	68.2	70.0	69.6	63.0	49.0	30.4	23.4	45.1	5	1893-1897
Des Moines	18.1	23.6	34.6	50.7	60.6	70.2	74.6	72.2	64.6	52.4	33.8	26.4	48.7	20	1878-1897
Dubuque	18.8	22.9	33.8	48.9	60.8	69.5	74.4	71.6	63.4	51.1	35.1	25.9	47.8	25	1873-1897
Dysart	16.4	22.2	31.5	53.3	66.6	76.2	80.7	77.9	69.9	57.1	37.6	23.9	51.4	10	1879-1888
Elkader	12.4	18.9	30.5	40.2	60.6	69.4	73.7	70.1	62.0	48.3	31.3	21.5	45.6	17	1879-1897
Fairfield	14.4	22.8	33.0	49.2	59.0	70.0	74.9	70.1	63.8	51.6	35.5	25.2	47.4	19	1879-1897
Fayette	15.1	20.0	30.2	47.5	58.8	68.5	71.9	68.6	63.6	44.8	31.1	24.0	45.5	8	1890-1897

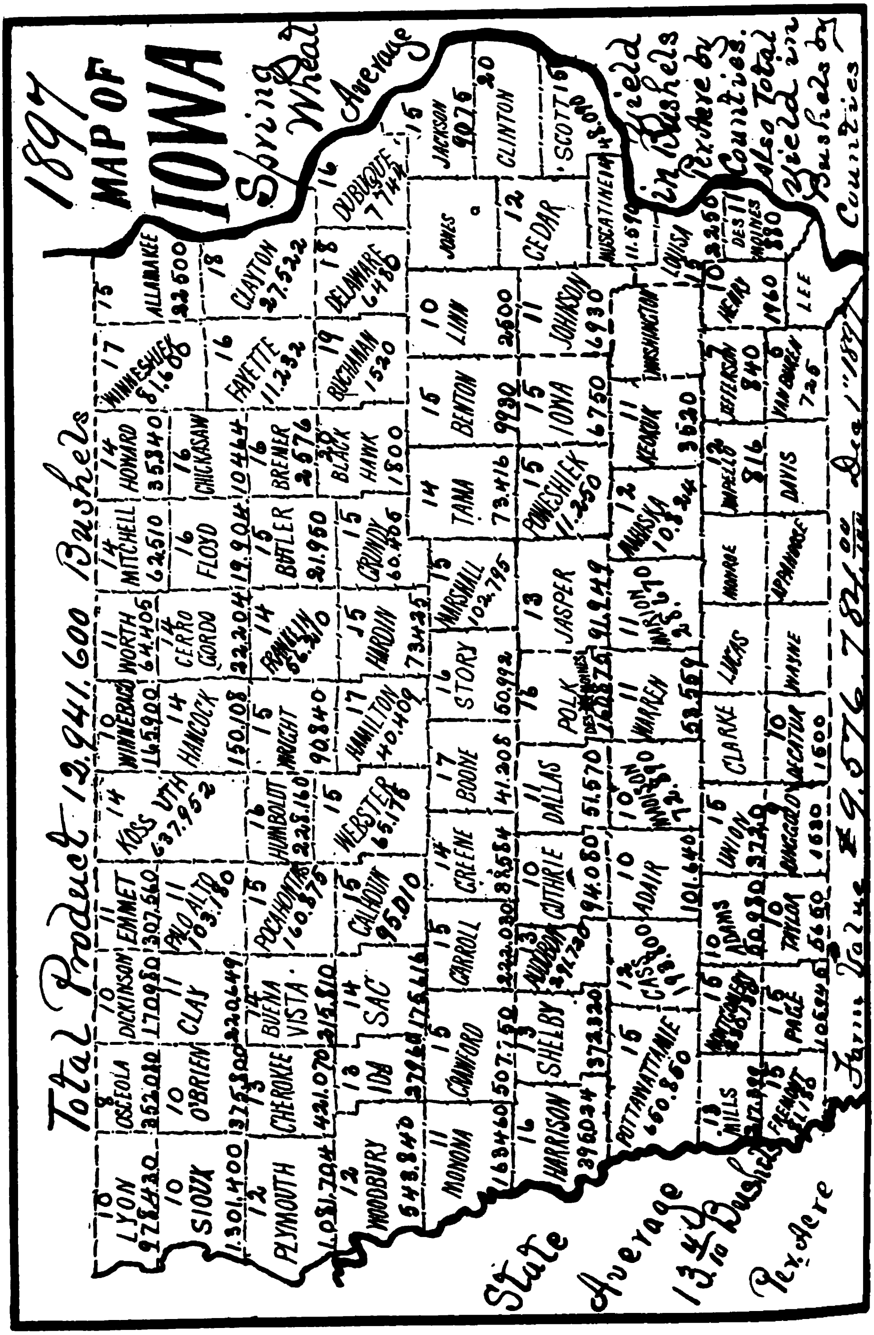
Garnaville	9.0	15.3	26.4	43.4	56.8	65.4	69.1	66.6	58.2	46.1	28.9	16.6	41.8	7	1880-1886
Galva	13.8	19.4	33.2	49.4	58.4	68.5	73.5	70.0	65.4	49.2	30.4	23.8	46.2	5	1893-1897
Glenwood	17.4	23.5	33.0	48.7	59.8	70.4	74.1	71.9	62.1	49.3	33.8	25.0	47.4	28	1867-1897
Grand Meadow	13.7	19.5	30.5	117.6	57.4	66.7	70.1	67.9	62.9	48.6	30.6	23.4	44.9	7	1891-1897
Greenfield	19.3	22.6	34.7	51.0	58.4	70.4	74.0	71.9	66.0	52.1	33.9	26.3	48.5	7	1891-1897
Grinnell	17.6	23.1	32.4	51.0	59.4	73.0	72.7	70.0	63.0	47.1	34.7	25.6	47.5	8	1890-1897
Grundy Center	13.7	19.8	31.5	49.0	58.1	69.6	72.0	69.6	63.9	50.1	30.6	24.0	46.0	7	1891-1897
Guttenburg	14.0	20.0	28.7	44.5	57.8	66.7	70.6	67.9	59.5	47.1	31.9	19.3	44.0	22	1864-1885
Hampton	13.1	17.8	28.2	46.8	56.8	67.8	71.5	68.5	62.2	48.4	29.6	21.8	44.4	8	1890-1897
Hopeville	19.7	23.4	34.6	52.0	60.0	70.0	73.3	71.9	67.1	53.6	34.0	26.7	49.9	7	1891-1897
Independence	14.7	20.3	30.2	47.2	59.4	68.9	71.1	68.0	59.9	47.1	32.0	21.2	44.8	36	1861-1897
Indianola	19.3	24.8	36.2	52.5	60.5	70.6	74.2	72.6	66.8	54.3	35.8	26.6	49.5	6	1892-1897
Iowa City	20.5	24.9	34.5	51.1	59.4	71.1	73.7	70.5	65.0	52.0	36.0	27.8	48.9	8	1890-1897
Iowa Falls	12.2	17.2	30.8	47.2	59.0	68.4	72.4	68.8	62.4	48.4	29.8	22.2	44.9	5	1893-1897
Keokuk	23.3	28.5	37.5	51.4	62.7	72.3	76.9	74.4	66.6	54.7	38.8	29.9	51.4	27	1871-1897
Keosauqua	21.5	26.3	38.7	53.0	62.0	73.2	76.5	74.0	68.0	55.2	37.3	27.6	51.1	6	1892-1897
Knoxville	22.8	25.2	36.2	53.7	63.0	71.8	75.6	72.8	67.0	52.2	36.0	26.4	50.1	5	1893-1897
Larrabee	15.9	20.3	30.1	48.7	57.9	69.6	72.6	70.1	64.7	49.9	30.0	23.6	46.1	7	1891-1897
Logan	19.9	23.9	33.6	52.4	60.1	71.5	74.9	72.0	66.5	52.9	34.9	25.3	48.2	33	1890-1897
Marshalltown	16.3	21.2	30.7	49.3	58.3	69.0	72.2	70.3	64.8	51.2	33.5	23.6	46.7	6	1891-1897
Maxon	17.0	23.2	35.4	53.4	62.0	72.7	75.8	73.5	66.7	51.6	33.8	26.4	49.8	6	1891-1897
Maquoketa	17.0	25.6	35.1	48.3	61.0	71.4	76.3	71.9	64.8	53.3	36.0	26.1	48.9	5	1881-1897
Mechanicsville	15.2	20.2	34.8	49.2	59.0	69.6	73.0	71.2	62.6	49.4	32.2	25.2	46.6	5	1892-1896
Monticello	15.2	21.4	31.8	48.3	59.2	68.7	72.9	70.0	61.6	48.5	33.2	22.2	46.1	44	1854-1897
Mt. Ayr	21.0	26.3	35.5	52.8	62.2	70.6	75.4	72.6	68.4	53.8	35.5	26.6	50.1	5	1892-1897
Mt. Vernon	18.4	20.7	35.7	52.1	61.0	72.2	75.6	72.8	65.4	51.0	34.3	25.7	48.7	7	1890-1897
Nashua	15.4	26.0	41.8	54.9	64.7	64.7	70.6	66.3	57.1	48.2	30.6	18.1	41.8	9	1879-1887
Newton	15.6	21.5	33.9	48.5	60.5	70.3	74.9	71.6	62.3	50.4	32.8	22.2	47.0	11	1878-1897
Osage	11.4	17.0	26.5	45.0	55.9	66.2	69.7	66.1	59.2	48.6	26.4	20.2	42.3	7	1891-1897
Oskaloosa	17.1	22.2	33.9	50.3	59.9	69.8	74.8	71.0	64.3	50.7	35.8	26.6	48.0	15	1883-1897
Ovid	22.0	24.5	37.0	53.5	61.6	71.2	75.6	73.6	68.0	53.4	35.8	27.4	50.3	5	1893-1897
Panama	18.5	21.2	33.0	50.7	59.2	69.3	72.3	71.0	65.0	49.5	31.8	25.2	47.2	6	1891-1896
Rock Rapids	13.0	17.0	28.8	49.2	57.6	68.4	73.4	69.8	63.0	48.4	28.0	21.0	44.8	5	1893-1897
Sac City	13.3	19.6	31.0	48.8	59.0	71.8	76.4	72.5	64.0	51.5	33.3	23.6	47.2	19	1870-1897
Seymour	23.2	26.5	38.8	53.4	61.8	71.8	75.6	74.0	68.2	54.2	36.8	31.0	51.3	5	1893-1897
Sibley	8.5	17.2	29.8	49.0	58.2	67.2	70.4	67.5	62.0	49.0	27.8	20.0	44.0	5	1893-1897
Smithland	14.4	17.0	28.5	44.5	63.1	67.9	70.7	70.9	56.8	49.5	26.9	16.4	43.9	4	1879-1882
Vinton	16.5	21.8	31.8	49.1	58.6	69.8	73.1	69.4	63.0	50.0	32.9	25.2	46.8	8	1890-1897
Villisca	19.8	24.0	35.8	52.8	61.8	70.8	74.2	70.2	65.2	51.2	35.0	20.4	48.4	5	1893-1897

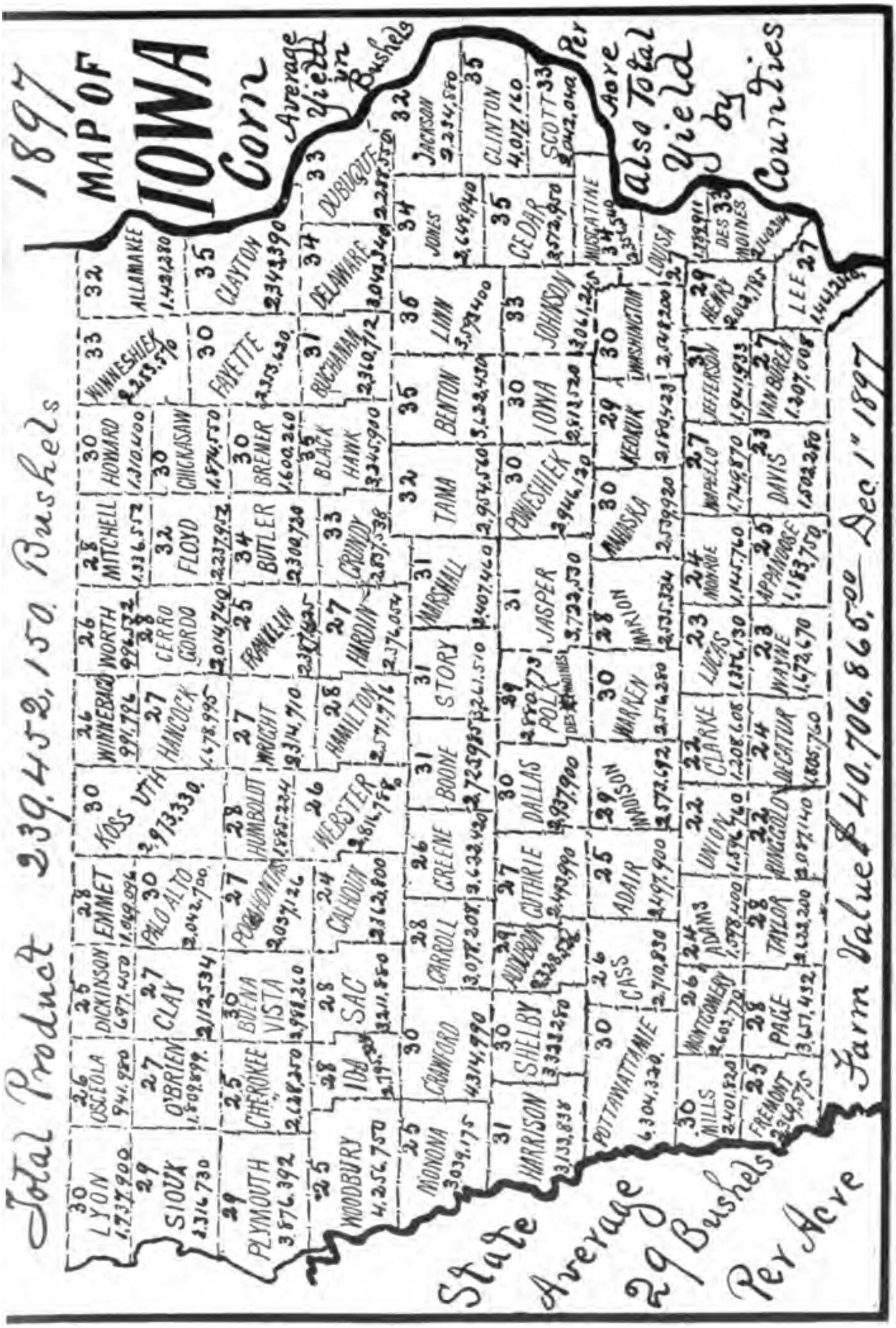
MEAN TEMPERATURE—CONTINUED.

STATIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Mean.	No. years.	Record included between dates below.
Washington	21.1	25.5	34 9	52.9	61.2	73.6	76.5	73.1	67.0	52.9	35.9	27.4	50.2	8	1890-1897
Waterloo	16.5	21.9	32.6	50.5	63.8	72.9	78.0	74.6	66.1	52.4	36.9	23.7	49.2	19	1863-1897
Webster City	15.2	18.8	30.4	46.4	56.8	69.4	73.8	70.8	65.4	50.8	31.0	22.2	45.9	5	1891-1897
Wesley	15.1	22.2	34.4	54.7	60.3	74.7	77.6	75.7	66.4	54.2	35.8	22.8	49.5	13	1879-1891
Winterset	19.0	23.3	33.7	51.6	60.4	70.3	73.6	71.3	66.0	52.0	33.5	26.3	48.4	7	1891-1897
Means	17.8	21.5	32.8	49.5	57.4	70.0	73.7	71.0	64.5	50.7	33.0	23.7	47.0	....	....

NOTE: The following maps were engraved for the annual report of the Agricultural Society, and are inserted in this volume by courtesy of Secretary Fowler.


1897 MAP OF IOWA
Winter Wheat
Average Yield in Bushels Per Acre by Counties.
Also Total Yield in Bushels by Counties
Total Product 1,671,454 Bushels
Farm Value $1,236,875.00/100 Dec. 1" 1897
State Average 13 Bushels Per Acre
LYON
OSCEOLA
DICKINSON
EMMET
KOSSUTH
WINNEBAGO
WORTH
MITCHELL 12 1080
HOWARD 18 1620
WINNESHIEK 15 753
ALLAMAKEE 10 21850
SIOUX
O'BRIEN
CLAY
PALO ALTO
HANCOCK
CERRO GORDO
FLOYD 10 1260
CHICKASAW 15 645
FAYETTE 12 7140
CLAYTON 15 96300
PLYMOUTH
CHEROKEE
BUENA VISTA
POCAHONTAS
HUMBOLDT
WRIGHT
FRANKLIN
BUTLER 15 750
BREMER 20 1780
BLACK HAWK
BUCHANAN 16 160
DELAWARE 15 378
DUBUQUE 13 6955
WOODBURY 10 1510
IDA
SAC
CALHOUN
WEBSTER
HAMILTON
HARDIN
GRUNDY
TAMA 18 10980
BENTON 10 3920
LINN 11 1220
JONES
JACKSON 18 24552
CLINTON 12 12340
MONONA 20 1280
CRAWFORD 10 570
CARROLL 13 590
GREENE
BOONE 12 564
STORY
MARSHALL 12 1440
POWESHIEK 18 7434
IOWA 13 7640
JOHNSON 17 35190
CEDAR 10 27720
SCOTT 8 97104
MUSCATINE 13 52440
HARRISON
SHELBY 10 2500
AUDUBON
GUTHRIE 14 14126
DALLAS 14 31640
POLK 20 14360
DES MOINES
JASPER 15 14380
MAHASKA 10 39000
KEOKUK 12 34236
WASHINGTON 16 37600
LOUISA 40248
POTTAWATTAMIE 10 9500
CASS 15 44350
ADAIR 17 6290
MADISON 11 27468
WARREN 15 10410
MARION 13 47389
MONROE 7 21189
WAPELLO 10 55820
JEFFERSON 9 33993
HENRY 13 52870
DES MOINES 11 40750
MILLS 16 16960
MONTGOMERY 15 40930
ADAMS 9 14850
UNION 16 5880
CLARKE 18 11880
LUCAS 13 34608
APPANOOSE 13 38680
DAVIS 8 26240
VAN BUREN 7 63714
LEE 7 94864
FREMONT 20 55720
PAGE 16 113280
TAYLOR 12 51480
RINGGOLD 13 20160
DECATUR 14 67420
WAYNE 10 11200


1897
MAP OF IOWA
Spring Wheat
Average Yield in Bushels Per Acre by Counties. Also Total Yield in Bushels by Counties
Total Product 12,941,600 Bushels
Farm Value $9,576,784.00 Dec. 1, 1897
State Average 13 4/10 Bushels Per Acre
LYON
OSCEOLA
DICKINSON
EMMET
KOSSUTH
WINNEBAGO
WORTH
MITCHELL
HOWARD
WINNESHIEK
ALLAMAKEE
SIOUX
O'BRIEN
CLAY
PALO ALTO
HANCOCK
CERRO GORDO
FLOYD
CHICKASAW
FAYETTE
CLAYTON
PLYMOUTH
CHEROKEE
BUENA VISTA
POCAHONTAS
HUMBOLDT
WRIGHT
FRANKLIN
BUTLER
BREMER
BUCHANAN
DELAWARE
DUBUQUE
WOODBURY
IDA
SAC
CALHOUN
WEBSTER
HAMILTON
HARDIN
GRUNDY
BLACK HAWK
MONONA
CRAWFORD
CARROLL
GREENE
BOONE
STORY
MARSHALL
TAMA
BENTON
LINN
JONES
JACKSON
CLINTON
HARRISON
SHELBY
AUDUBON
GUTHRIE
DALLAS
POLK
DES MOINES
JASPER
POWESHIEK
IOWA
JOHNSON
CEDAR
SCOTT
MUSCATINE
POTTAWATTAMIE
CASS
ADAIR
MADISON
WARREN
MARION
MAHASKA
KEOKUK
WASHINGTON
LOUISA
MILLS
MONTGOMERY
ADAMS
UNION
CLARKE
LUCAS
MONROE
WAPELLO
JEFFERSON
HENRY
DES MOINES
FREMONT
PAGE
TAYLOR
RINGGOLD
DECATUR
WAYNE
APPANOOSE
DAVIS
VAN BUREN
LEE


1897 MAP OF IOWA Corn
Average Yield in Bushels Per Acre
Also Total Yield by Counties
Total Product 239,452,150 Bushels
Farm Value $40,706,866.00 Dec 1st 1897
State Average 29 Bushels Per Acre
30 LYON 1,737,900
26 OSCEOLA 941,980
25 DICKINSON 697,450
28 EMMET 1,049,096
30 KOSSUTH 2,973,330
26 WINNEBAGO 994,796
26 WORTH 996,372
28 MITCHELL 1,336,572
30 HOWARD 1,310,400
33 WINNESHIEK 2,255,570
32 ALLAMAKEE 1,431,230
29 SIOUX 1,316,730
27 O'BRIEN 1,509,899
27 CLAY 2,112,534
30 PALO ALTO 2,042,700
27 HANCOCK 1,678,995
28 CERRO GORDO 3,014,740
32 FLOYD 2,237,952
30 CHICKASAW 1,574,550
30 FAYETTE 2,313,630
35 CLAYTON 2,343,390
29 PLYMOUTH 3,876,392
25 CHEROKEE 2,138,250
30 BUENA VISTA 2,998,260
27 POCAHONTAS 2,057,126
28 HUMBOLDT 1,585,224
27 WRIGHT 2,314,710
25 FRANKLIN 2,377,425
34 BUTLER 2,300,720
30 BREMER 1,600,260
31 BUCHANAN 2,360,712
34 DELAWARE 3,043,340
33 DUBUQUE 2,287,550
25 WOODBURY 4,256,750
28 IDA
28 SAC 3,211,880
24 CALHOUN 2,362,800
26 WEBSTER 2,816,778
28 HAMILTON 2,571,776
27 HARDIN 2,376,054
33 GRUNDY 2,517,338
35 BLACK HAWK 2,345,980
35 BENTON 3,633,430
36 LINN 3,593,400
34 JONES 3,649,940
32 JACKSON 3,234,880
35 CLINTON 4,012,160
33 SCOTT 3,042,040
35 CEDAR 3,572,980
34 MUSCATINE 2,354,540
25 MONONA 3,034,175
30 CRAWFORD 4,314,990
28 CARROLL 3,077,208
26 GREENE 3,633,420
31 BOONE 2,725,985
31 STORY 3,261,510
31 MARSHALL 3,407,460
32 TAMA 2,954,560
30 POWESHIEK 2,946,120
30 IOWA 2,812,520
33 JOHNSON 3,061,245
31 HARRISON 3,133,838
30 SHELBY 3,338,280
29 AUDUBON
27 GUTHRIE 2,493,990
30 DALLAS 2,937,900
29 POLK 2,550,773
DES MOINES
31 JASPER 3,723,530
30 POTTAWATTAMIE 6,304,320
26 CASS 2,710,830
25 ADAIR 2,497,900
29 MADISON 2,573,692
30 WARREN 2,574,280
28 MARION 2,535,324
30 MAHASKA 2,539,920
29 KEOKUK 2,590,423
30 WASHINGTON 2,548,200
27 LOUISA
30 MILLS 2,401,820
26 MONTGOMERY 2,603,770
24 ADAMS 1,578,400
22 UNION 1,594,740
22 CLARKE 1,208,608
23 LUCAS 1,374,130
24 MONROE 1,145,760
27 WAPELLO 1,749,870
31 JEFFERSON 1,941,933
29 HENRY 2,043,785
33 DES MOINES
25 FREMONT 2,369,575
28 PAGE 3,651,432
28 TAYLOR 2,433,200
22 RINGGOLD 2,087,140
24 DECATUR 1,805,760
23 WAYNE 1,674,670
25 APPANOOSE 1,183,750
23 DAVIS 1,502,280
27 VAN BUREN 1,307,008
27 LEE

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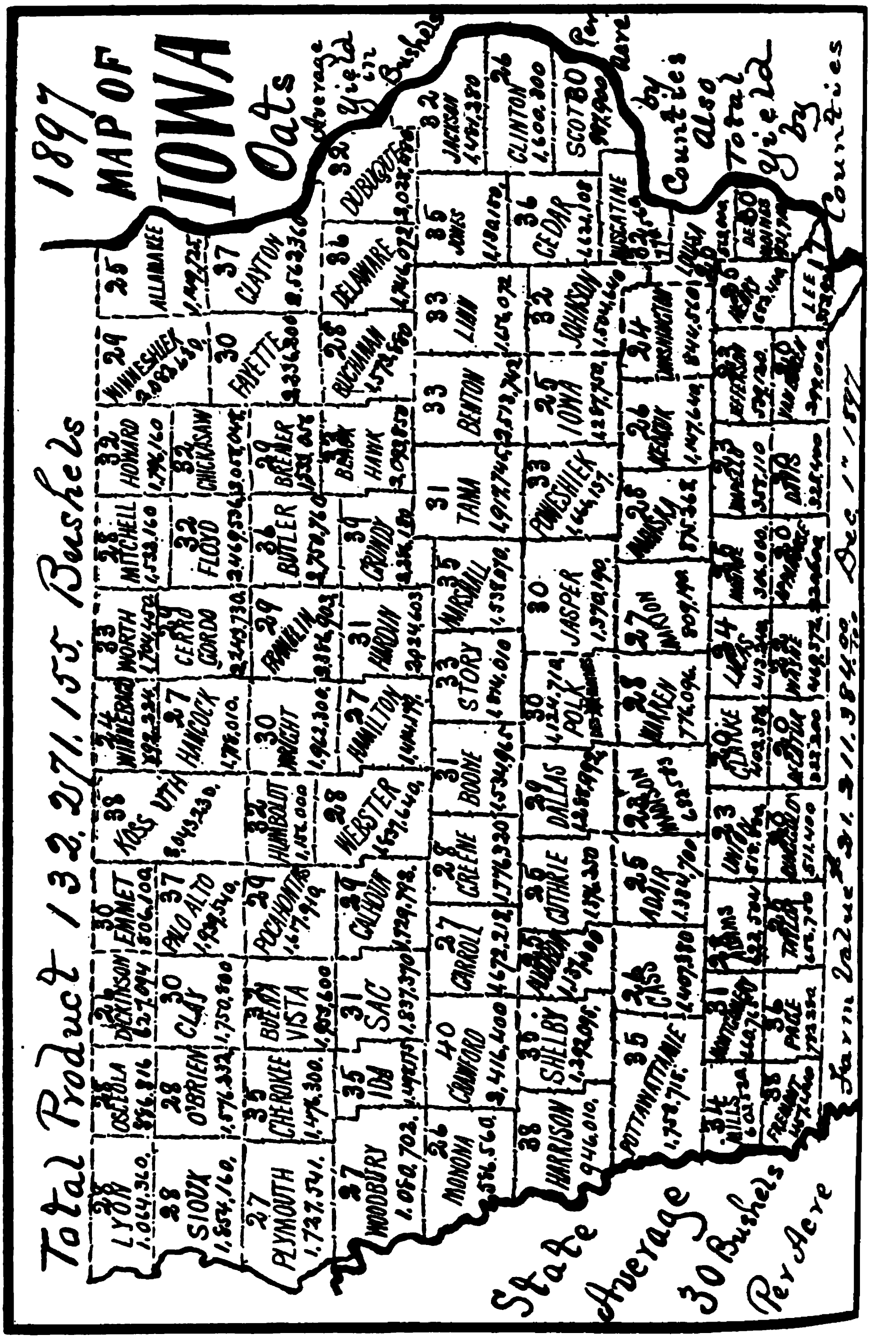
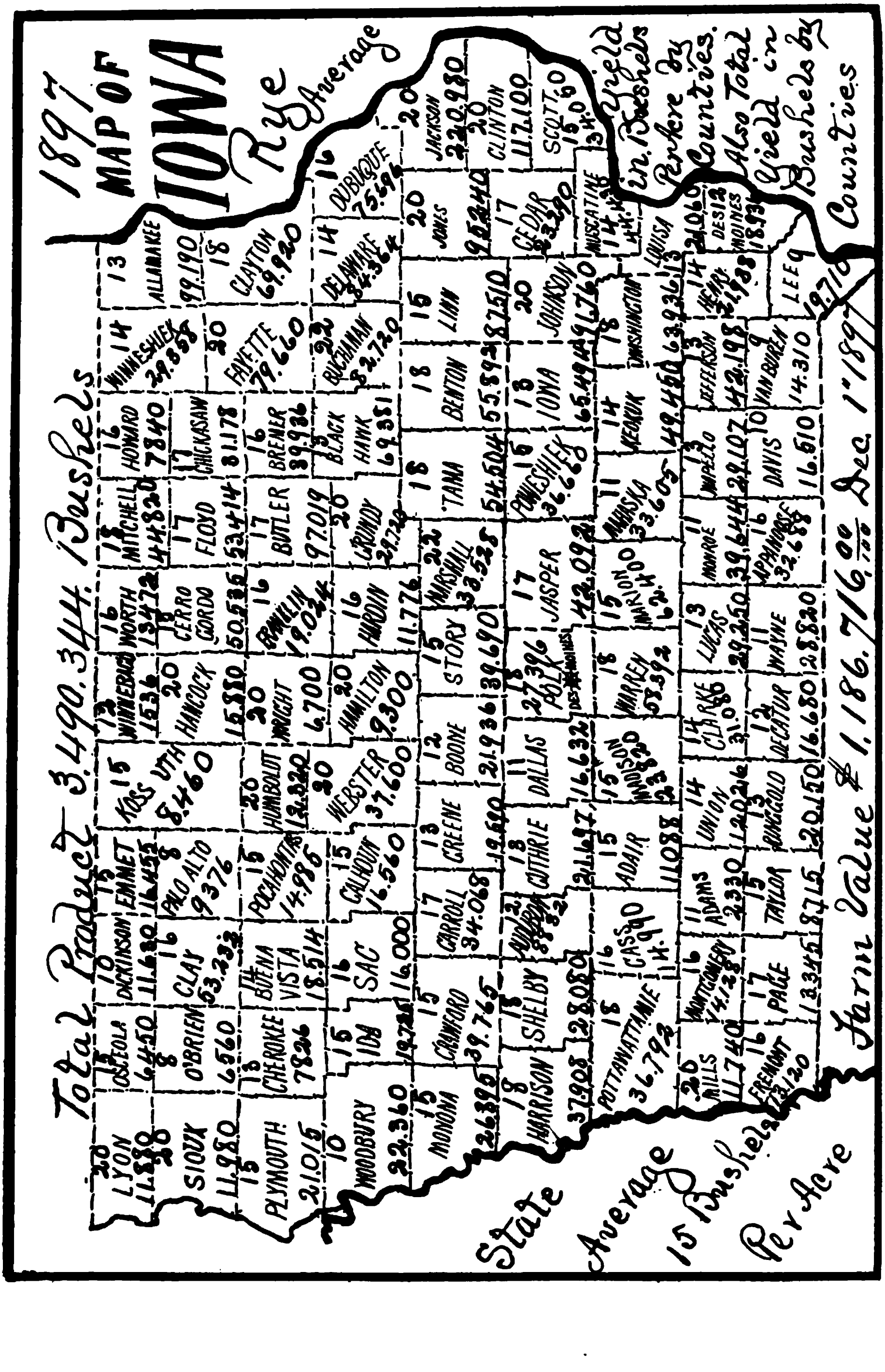
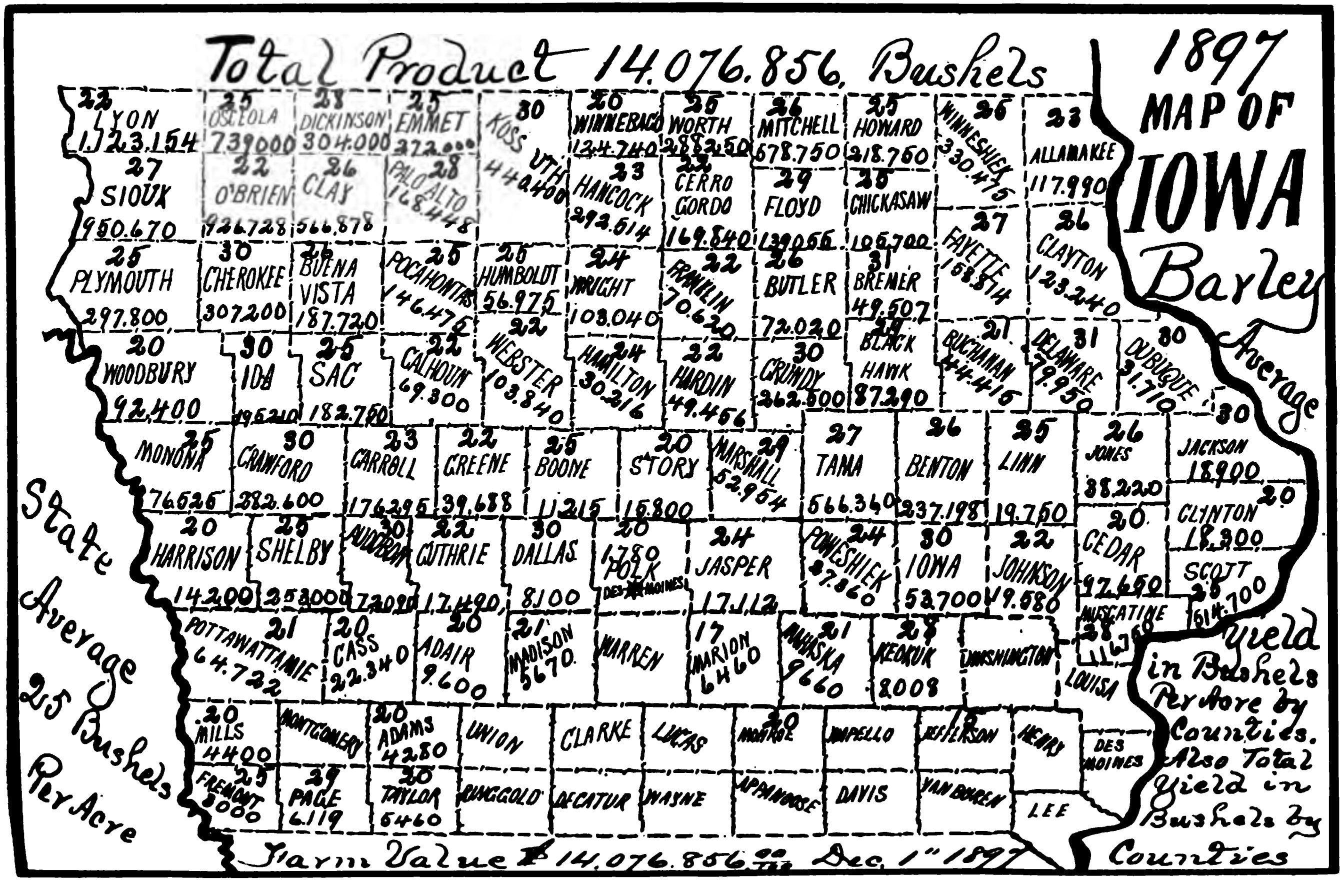
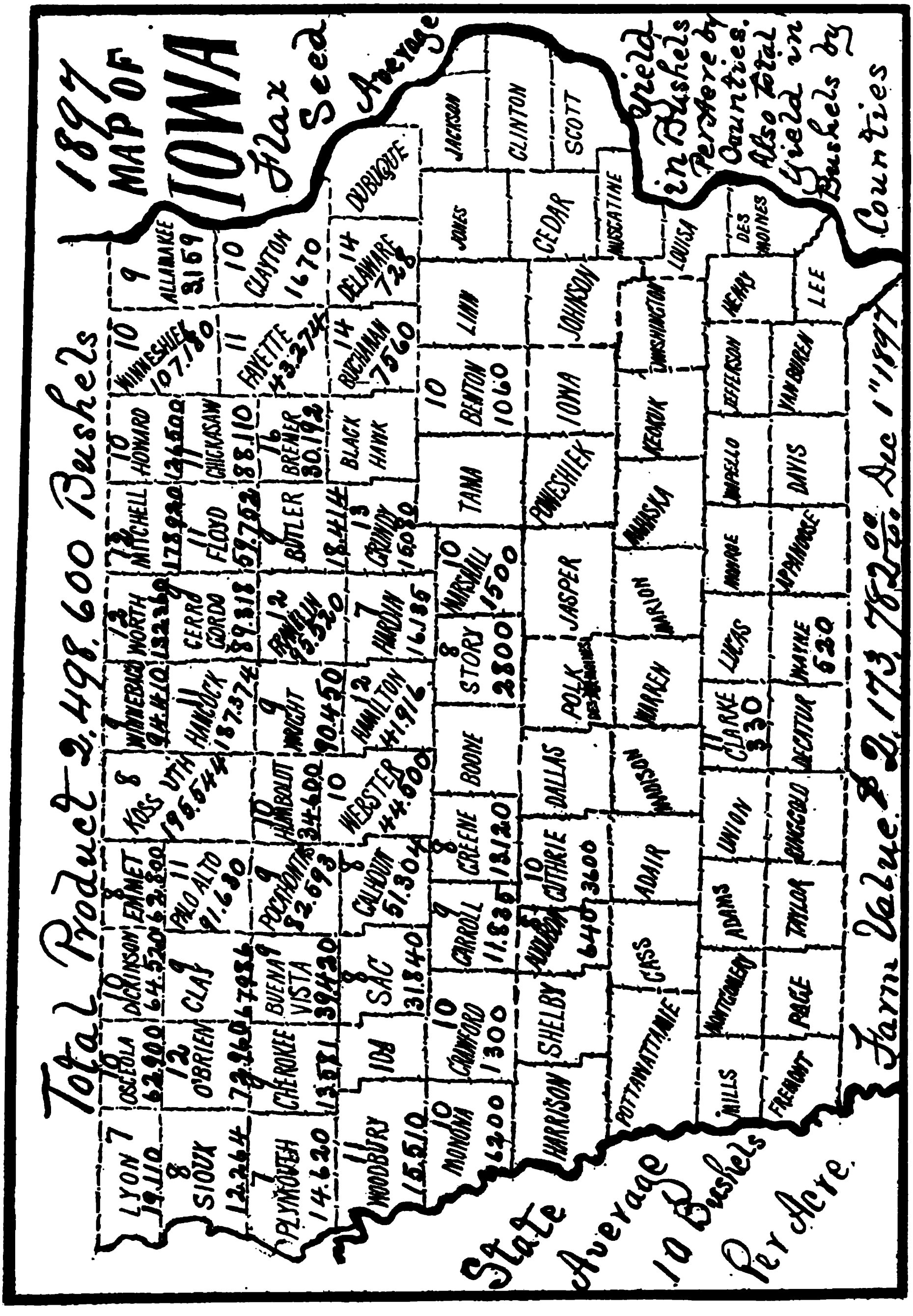
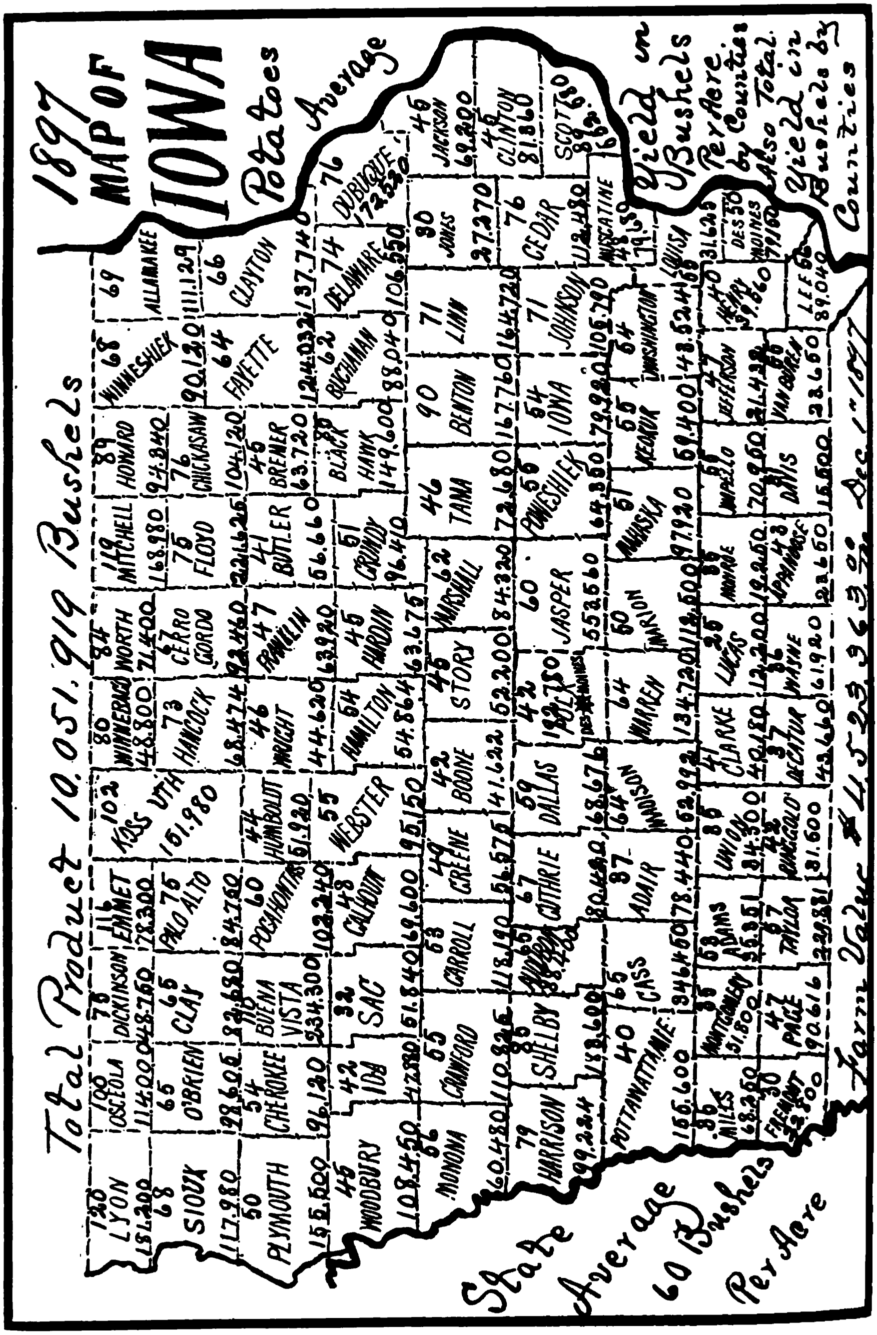
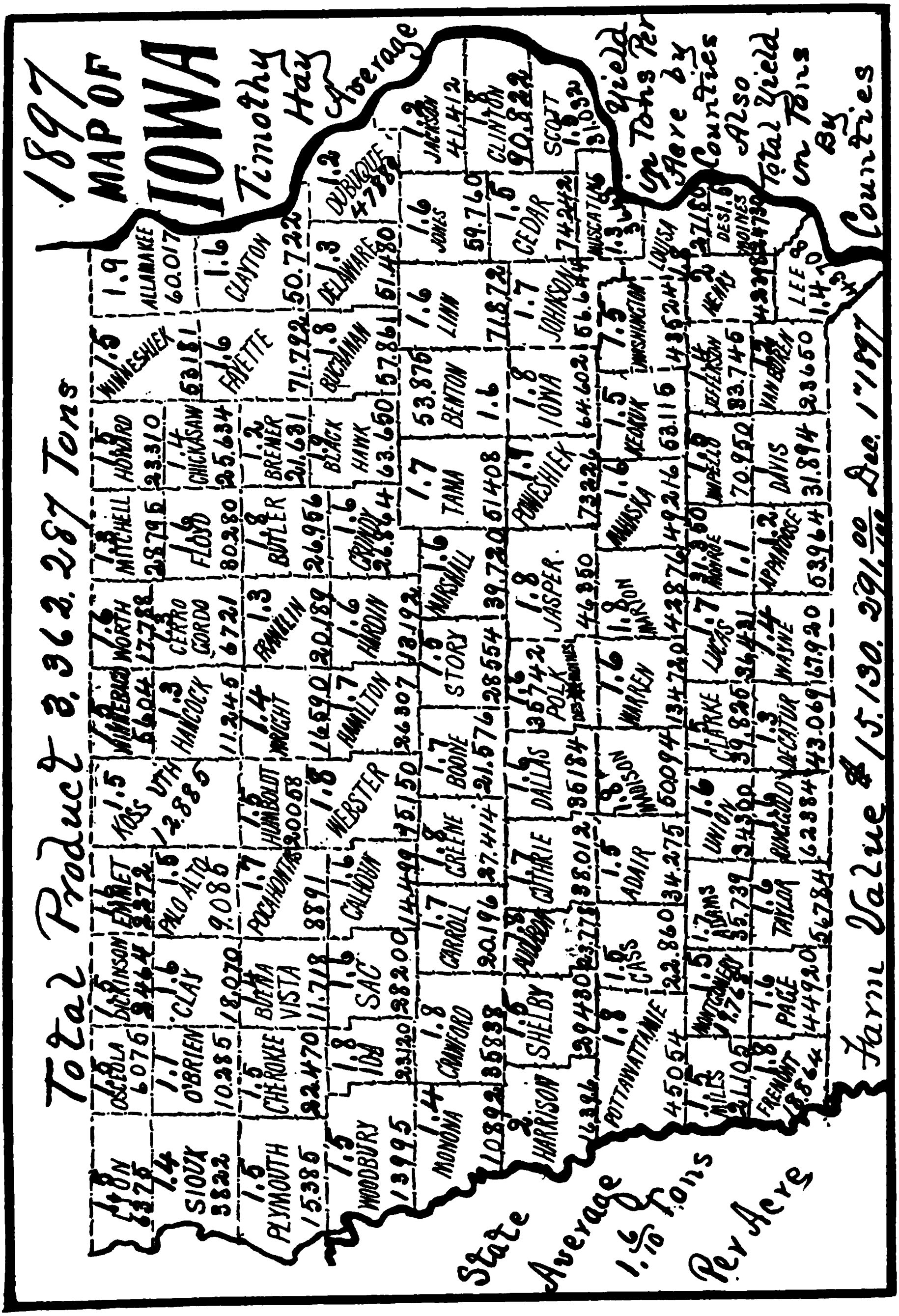

1897
MAP OF IOWA
Oats
Total Product 132,271,155 Bushels
Average yield in Bushels Per Acre by Counties also Total yield by Counties
State Average 30 Bushels Per Acre
Farm Value $31,311,984.00 Dec 1st 1897
LYON
OSCEOLA
DICKINSON
EMMET
KOSSUTH
WINNEBAGO
WORTH
MITCHELL
HOWARD
WINNESHIEK
ALLAMAKEE
SIOUX
O'BRIEN
CLAY
PALO ALTO
HANCOCK
CERRO GORDO
FLOYD
CHICKASAW
FAYETTE
CLAYTON
PLYMOUTH
CHEROKEE
BUENA VISTA
POCAHONTAS
HUMBOLDT
WRIGHT
FRANKLIN
BUTLER
BREMER
BUCHANAN
DELAWARE
DUBUQUE
WOODBURY
IDA
SAC
CALHOUN
WEBSTER
HAMILTON
HARDIN
GRUNDY
BLACK HAWK
MONONA
CRAWFORD
CARROLL
GREENE
BOONE
STORY
MARSHALL
TAMA
BENTON
LINN
JONES
JACKSON
HARRISON
SHELBY
AUDUBON
GUTHRIE
DALLAS
POLK
JASPER
POWESHIEK
IOWA
JOHNSON
CEDAR
CLINTON
SCOTT
POTTAWATTAMIE
CASS
ADAIR
MADISON
WARREN
MARION
MAHASKA
KEOKUK
WASHINGTON
MUSCATINE
LOUISA
MILLS
MONTGOMERY
ADAMS
UNION
CLARKE
LUCAS
MONROE
WAPELLO
JEFFERSON
HENRY
DES MOINES
FREMONT
PAGE
TAYLOR
RINGGOLD
DECATUR
WAYNE
APPANOOSE
DAVIS
VAN BUREN
LEE

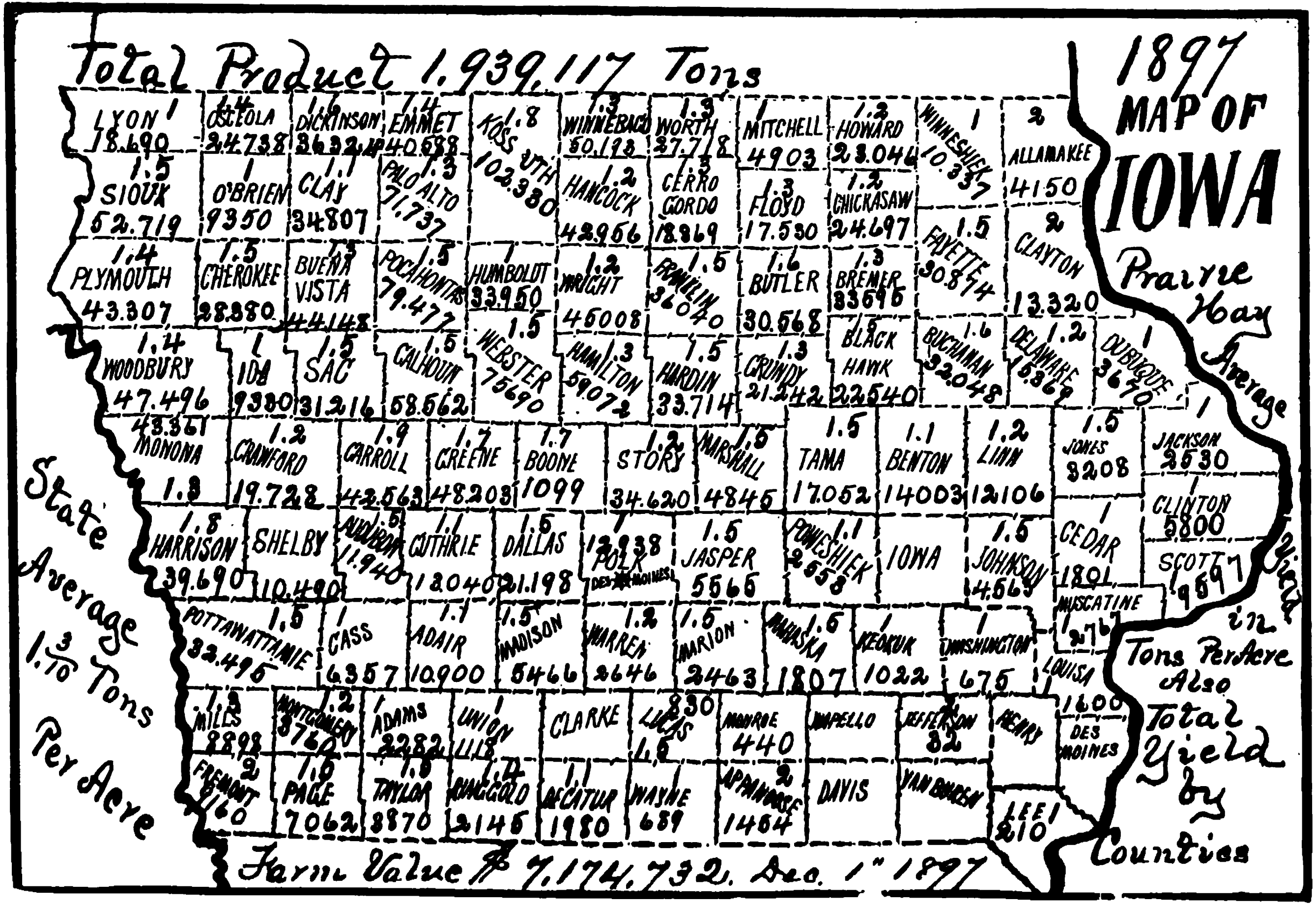

1897 MAP OF IOWA
Rye Average Yield in Bushels Per Acre by Counties. Also Total Yield in Bushels by Counties
Total Product 3,490,344 Bushels
Farm Value $1,186,716 00/100 Dec 1' 1897
State Average 15 Bushels Per Acre
LYON 20 11,880
SIOUX 20 11,980
PLYMOUTH 15 21,015
WOODBURY 10 22,360
MONONA 15 26,395
HARRISON 18 37,908
POTTAWATTAMIE 18 36,792
MILLS 20 11,740
FREMONT 16 23,120
OSCEOLA 13 6,450
O'BRIEN 8 6,560
CHEROKEE 18 7,826
IDA 15 19,736
CRAWFORD 15 39,765
SHELBY 18 28,080
CASS 16 14,910
MONTGOMERY 16 14,128
PAGE 17 13,345
DICKINSON 10 11,680
CLAY 16 53,232
BUENA VISTA 14 18,514
SAC 16 16,000
CARROLL 17 34,068
AUDUBON 12 8,832
ADAMS 11 2,330
TAYLOR 15 8,715
EMMET 15 16,455
PALO ALTO 8 9,376
POCAHONTAS 15 14,986
CALHOUN 15 16,560
GREENE 13 19,680
GUTHRIE 13 21,697
ADAIR 15 11,088
UNION 14 12,024
RINGGOLD 13 20,150
KOSSUTH 15 8,460
HUMBOLDT 20 12,820
WEBSTER 20 37,600
BOONE 12 21,936
DALLAS 11 16,632
MADISON 15 23,820
CLARKE 14 31,086
DECATUR 12 16,680
WINNEBAGO 13 1,536
HANCOCK 20 15,880
WRIGHT 20 6,700
HAMILTON 20 9,300
STORY 15 39,690
POLK 18 27,396
DES MOINES
WARREN 18 57,392
LUCAS 13 29,250
WAYNE 11 28,820
WORTH 16 13,472
CERRO GORDO 20 50,536
FRANKLIN 16 19,024
HARDIN 16 11,776
MARSHALL 22 38,528
JASPER 17 42,092
MARION 15 62,400
MONROE 11 39,644
APPANOOSE 16 32,688
MITCHELL 18 44,820
FLOYD 17 53,414
BUTLER 17 97,019
GRUNDY 20 29,720
TAMA 18 54,504
POWESHIEK 16 36,668
MAHASKA 11 33,605
WAPELLO 13 24,107
DAVIS 10 16,610
HOWARD 16 7,840
CHICKASAW 17 81,178
BREMER 16 39,936
BLACK HAWK 15 69,351
BENTON 18 55,894
IOWA 18 65,494
KEOKUK 14 49,450
JEFFERSON 13 42,198
VAN BUREN 9 14,310
WINNESHIEK 14 29,858
FAYETTE 20 79,660
BUCHANAN 22 82,720
LINN 15 87,510
JOHNSON 20 91,760
WASHINGTON 18 63,936
HENRY 14 41,988
LEE 9 19,710
ALLAMAKEE 13 99,190
CLAYTON 18 69,920
DELAWARE 14 84,364
JONES 20 95,840
CEDAR 17 33,290
MUSCATINE 14
LOUISA
DES MOINES 14 18,939
DUBUQUE 16 75,696
JACKSON 20 220,980
CLINTON 20 117,100
SCOTT 34 15,050


Total Product 14.076.856 Bushels
1897 MAP OF IOWA Barley Average
Yield in Bushels Per Acre by Counties. Also Total Yield in Bushels by Counties
State Average 25 Bushels Per Acre
Farm Value $14,076.856.00 Dec. 1" 1897
22 LYON 1.123.154
25 OSCEOLA 739000
28 DICKINSON 304.000
25 EMMET 272.000
30 KOSSUTH 442.400
26 WINNEBAGO 124.740
25 WORTH 288.250
26 MITCHELL 678.750
25 HOWARD 218.750
26 WINNESHIEK 330.475
23 ALLAMAKEE 117.990
27 SIOUX 950.670
22 O'BRIEN 926.728
26 CLAY 566.878
28 PALO ALTO 168.448
23 HANCOCK 292.514
24 CERRO GORDO 169.840
29 FLOYD 139055
25 CHICKASAW 105.700
27 FAYETTE 158.514
26 CLAYTON 123.240
25 PLYMOUTH 297.800
30 CHEROKEE 307200
26 BUENA VISTA 187.720
25 POCAHONTAS 146.476
26 HUMBOLDT 56.975
24 WRIGHT 103.040
22 FRANKLIN 70.620
26 BUTLER 72.020
31 BREMER 49.507
21 BUCHANAN 44.415
31 DELAWARE 79.950
30 DUBUQUE 31.710
20 WOODBURY 92.400
30 IDA 195210
25 SAC 182.750
22 CALHOUN 69.300
22 WEBSTER 103.840
24 HAMILTON 30.216
22 HARDIN 49.456
30 GRUNDY 262.500
24 BLACK HAWK 87290
25 MONONA 76.626
30 CRAWFORD 282.600
23 CARROLL 176295
22 GREENE 39.688
25 BOONE 11215
20 STORY 15800
29 MARSHALL 52.954
27 TAMA 566.340
26 BENTON 237.198
25 LINN 19.750
26 JONES 38.220
30 JACKSON 18.900
20 CLINTON 18.300
20 HARRISON 14200
25 SHELBY 253000
30 AUDUBON 72090
22 GUTHRIE 17.490
30 DALLAS 8100
20 POLK 1780
DES MOINES
24 JASPER 17.112
24 POWESHIEK 87.860
30 IOWA 52700
22 JOHNSON 19.580
20 CEDAR 97.650
25 SCOTT 614.700
28 MUSCATINE 11.670
21 POTTAWATTAMIE 64.722
20 CASS 22.340
20 ADAIR 9.600
21 MADISON 5670
WARREN
17 MARION 6460
21 MAHASKA 9660
28 KEOKUK 2008
WASHINGTON
LOUISA
20 MILLS 4400
MONTGOMERY
20 ADAMS 4280
UNION
CLARKE
LUCAS
20 MONROE
WAPELLO
18 JEFFERSON
HENRY
DES MOINES
25 FREMONT 3000
29 PAGE 6.119
20 TAYLOR 5460
RINGGOLD
DECATUR
WAYNE
APPANOOSE
DAVIS
VAN BUREN
LEE


1897 MAP OF IOWA
Flax Seed Average Yield in Bushels Per Acre by Counties. Also Total Yield in Bushels by Counties
Total Product 2,498,600 Bushels
Farm Value $2,173,782.00 Dec 1" 1897
State Average 10 Bushels Per Acre.
LYON 7 19,110
SIOUX 8 12,264
PLYMOUTH 7 14,620
WOODBURY 11 15,510
MONONA 10 6,200
OSCEOLA 10 62,900
O'BRIEN 12 72,160
CHEROKEE 9 13,581
IDA
CRAWFORD 10 1,300
HARRISON
DICKINSON 10 64,520
CLAY 9 67,956
BUENA VISTA 9 39,420
SAC 8 31,840
CARROLL 9 11,835
SHELBY
POTTAWATTAMIE
MILLS
FREMONT
EMMET 8 62,800
PALO ALTO 11 91,680
POCAHONTAS 9 52,693
CALHOUN 8 51,304
AUDUBON 8 640
CASS
MONTGOMERY
PAGE
KOSSUTH 8 195,544
HUMBOLDT 10 34,600
WEBSTER 10 44,600
GREENE 8 13,120
GUTHRIE 10 3,600
ADAIR
ADAMS
TAYLOR
WINNEBAGO 9 94,410
HANCOCK 11 187,374
WRIGHT 9 90,450
HAMILTON 12 41,916
BOONE
DALLAS
MADISON
UNION
RINGGOLD
WORTH 12 132,319
CERRO GORDO 89,318
FRANKLIN 12 95,520
HARDIN 7 16,136
STORY 8 2,800
POLK
DES MOINES
WARREN
CLARKE 11 330
DECATUR
MITCHELL 12 178,920
FLOYD 11 59,762
BUTLER 9 18,414
GRUNDY 13 16,030
MARSHALL 10 1,500
JASPER
MARION
LUCAS
WAYNE 620
HOWARD 10 136,500
CHICKASAW 11 88,110
BREMER 16 30,192
BLACK HAWK
TAMA
POWESHIEK
MAHASKA
MONROE
APPANOOSE
WINNESHIEK 10 107,180
FAYETTE 11 43,274
BUCHANAN 14 7,560
BENTON 10 1060
IOWA
KEOKUK
WAPELLO
DAVIS
ALLAMAKEE 9 3,159
CLAYTON 10 1,670
DELAWARE 14 728
LINN
JOHNSON
WASHINGTON
JEFFERSON
VAN BUREN
DUBUQUE
JONES
CEDAR
MUSCATINE
LOUISA
HENRY
LEE
JACKSON
CLINTON
SCOTT
DES MOINES


1897 MAP OF IOWA
Potatoes Average Yield in Bushels Per Acre by Counties
Also Total Yield in Bushels by Counties
Total Product 10,051,919 Bushels
State Average 60 Bushels Per Acre
Farm Value $4,523,963.00 Dec 1st 1897


1897 MAP OF IOWA
Timothy Hay
Average Yield in Tons Per Acre by Counties
Also Total Yield in Tons By Counties
Total Product 2,362,287 Tons
Farm Value $15,130,291.00 Dec. 1" 1897
State Average 1 6/10 Tons Per Acre
LYON 1.8 6376
OSCEOLA 1.8 6076
DICKINSON 1.5 9464
EMMET 1.6 8872
KOSSUTH 1.5 12885
WINNEBAGO 1.5 5604
WORTH 1.6 17788
MITCHELL 1.5 28795
HOWARD 1.5 23310
WINNESHIEK 1.5 53181
ALLAMAKEE 1.9 60017
SIOUX 1.4 3822
O'BRIEN 1.7 10285
CLAY 1.6 18070
PALO ALTO 1.5 9088
HANCOCK 1.3 11245
CERRO GORDO 1.5 6721
FLOYD 1.6 30280
CHICKASAW 1.4 25634
FAYETTE 1.6 71792
CLAYTON 1.6 50722
PLYMOUTH 1.6 15385
CHEROKEE 1.5 22470
BUENA VISTA 1.4 11718
POCAHONTAS 1.7 8891
HUMBOLDT 1.5 20058
WRIGHT 1.4 16590
FRANKLIN 1.3 20189
BUTLER 1.8 26956
BREMER 1.2 21631
BLACK HAWK 1.7 63650
BUCHANAN 1.8 57861
DELAWARE 1.3 51480
DUBUQUE 1.2 47882
WOODBURY 1.5 13995
IDA 1.8 23120
SAC 1.6 28200
CALHOUN 1.6 14499
WEBSTER 1.8 75150
HAMILTON 1.7 26307
HARDIN 1.6 48192
GRUNDY 1.6 26564
TAMA 1.7 51408
BENTON 1.6 53876
LINN 1.6 71872
JONES 1.6 59760
JACKSON 1.9 41412
CLINTON 1.8 90822
CEDAR 1.5 74242
SCOTT 1.8
MONONA 1.4 10892
CRAWFORD 1.8 35888
CARROLL 1.7 30196
GREENE 1.8 27414
BOONE 1.7 21576
STORY 1.5 28554
MARSHALL 1.6 39720
JASPER 1.8 46350
POWESHIEK 1.7 73226
IOWA 1.8 64602
JOHNSON 1.7 56644
MUSCATINE 1.3
HARRISON 2. 16396
SHELBY 1.5 39480
AUDUBON 1.8 23778
GUTHRIE 1.7 38012
DALLAS 1.6 36184
POLK 1.5 35742
DES MOINES
MARION 1.8 42876
MAHASKA 1.6 49216
KEOKUK 1.5 63116
WASHINGTON 1.5 43520
LOUISA 1.8
POTTAWATTAMIE 1.8 45054
CASS 1.5 22860
ADAIR 1.5 34275
MADISON 1.8 50094
WARREN 1.6 13472
CLARKE 1.5 39826
LUCAS 1.7 36481
MONROE 1.1 31360
WAPELLO 1.8 70950
JEFFERSON 1.6 33746
HENRY 2.
DES MOINES
LEE 1.8
MILLS 1.5 21105
MONTGOMERY 1.5 17762
ADAMS 1.7 35739
UNION 1.6 34300
RINGGOLD 1.8 62384
DECATUR 1.3 43069
WAYNE 1.4 67920
APPANOOSE 1.2 63964
DAVIS 31894
VAN BUREN 1.4 23650
FREMONT 1.8 18864
PAGE 1.6 44920
TAYLOR 1.6 56784



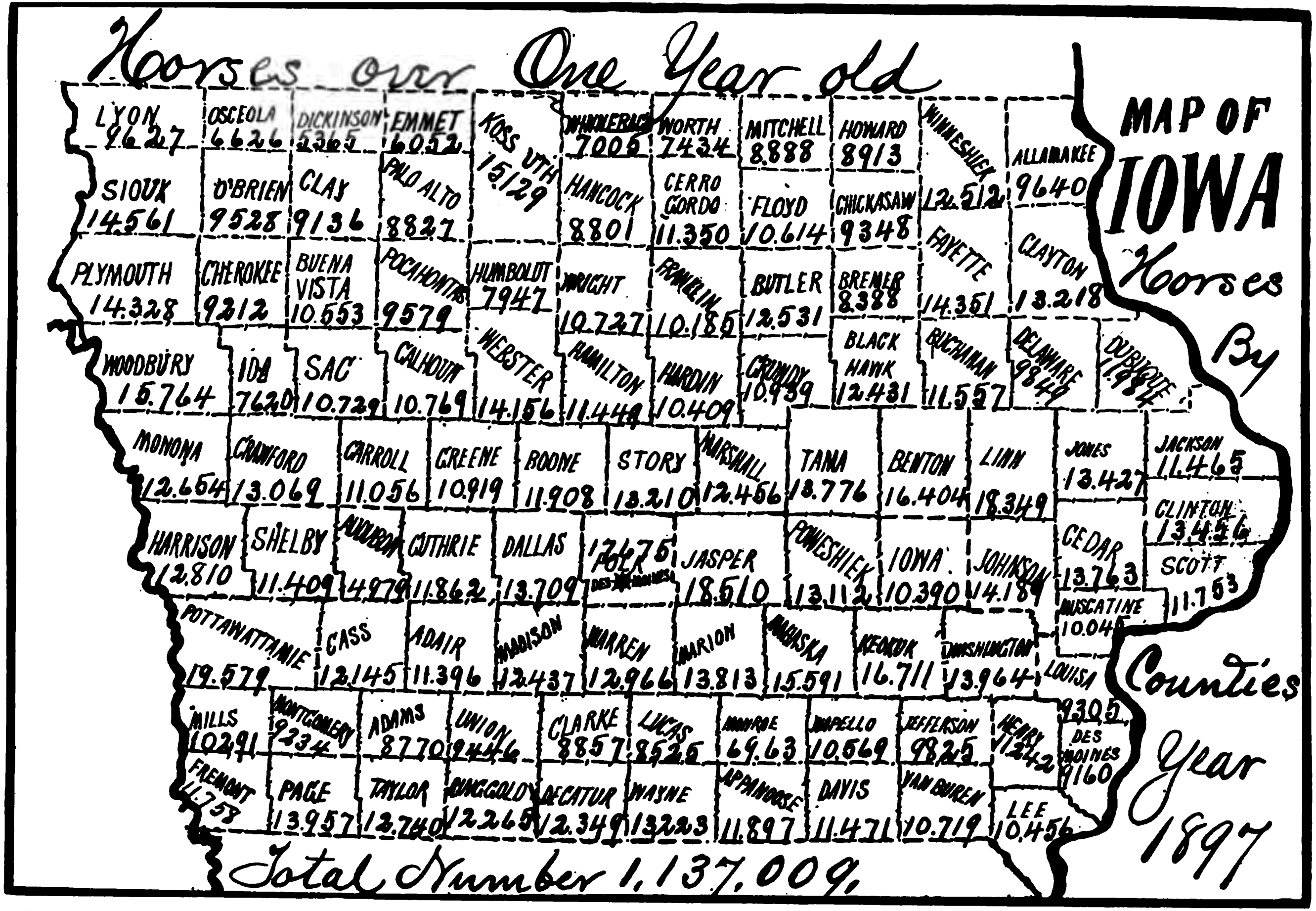
1897 MAP OF IOWA

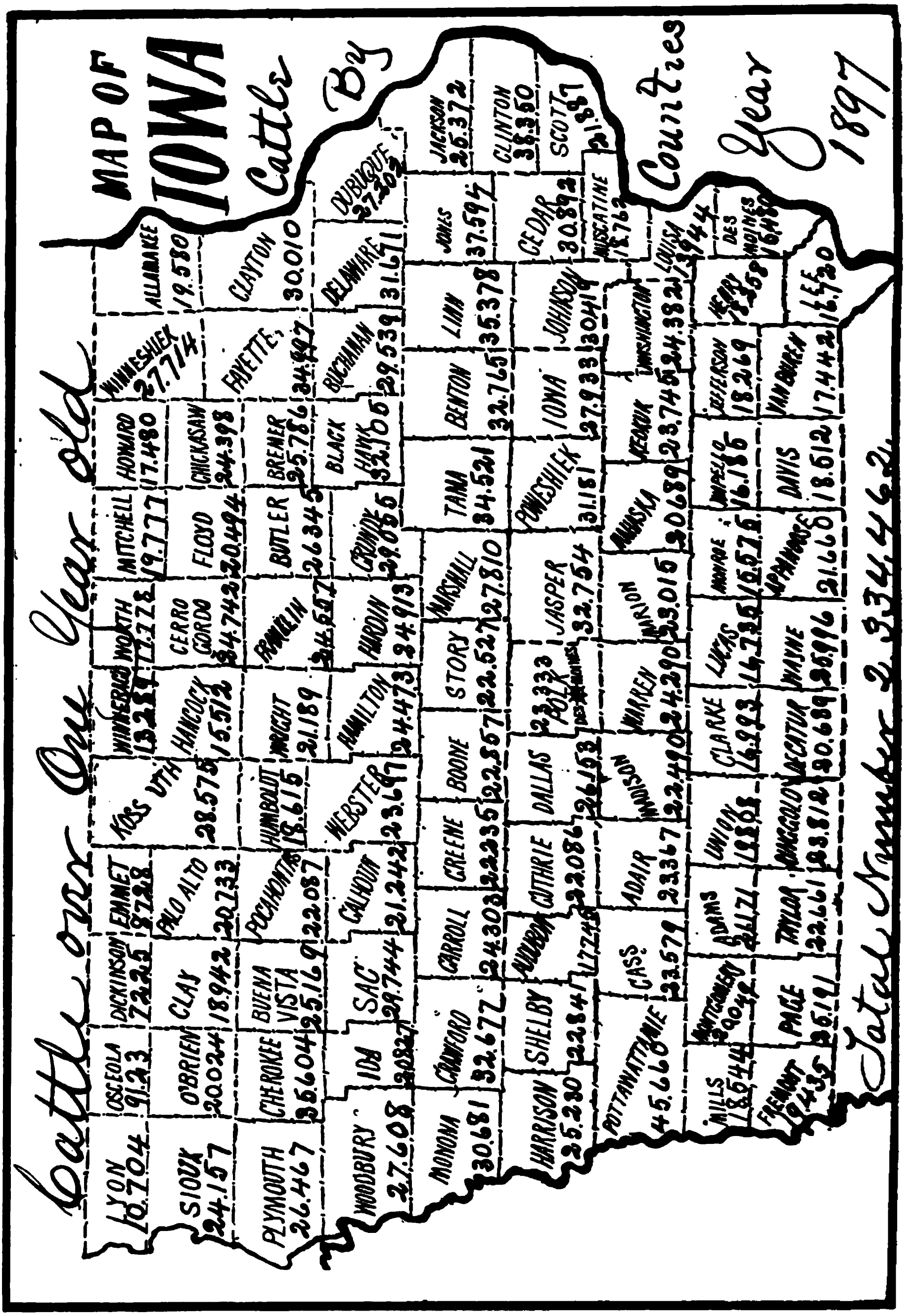
Prairie Hay Average Yield in Tons Per Acre Also Total Yield by Counties

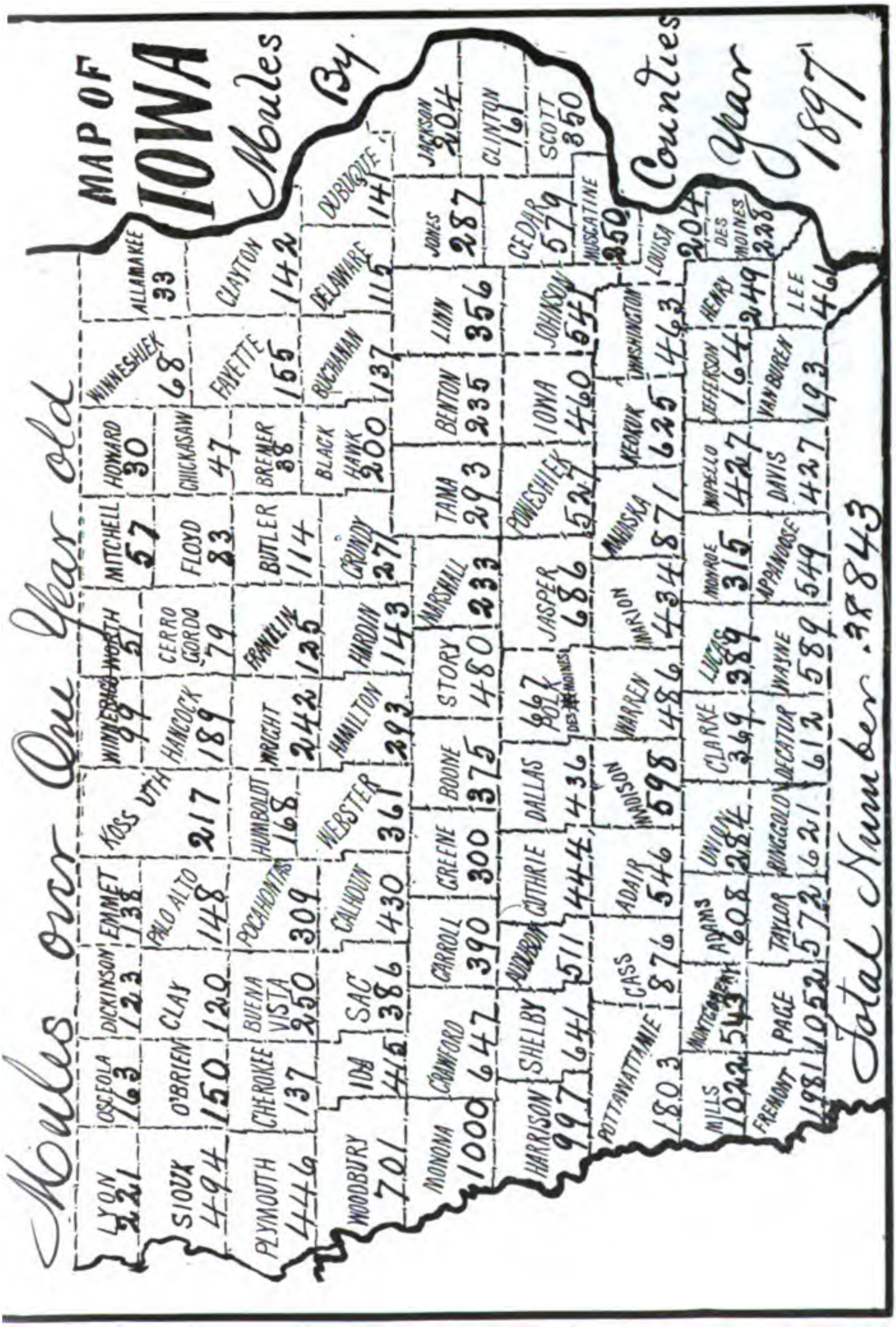
Total Product 1,939,117 Tons

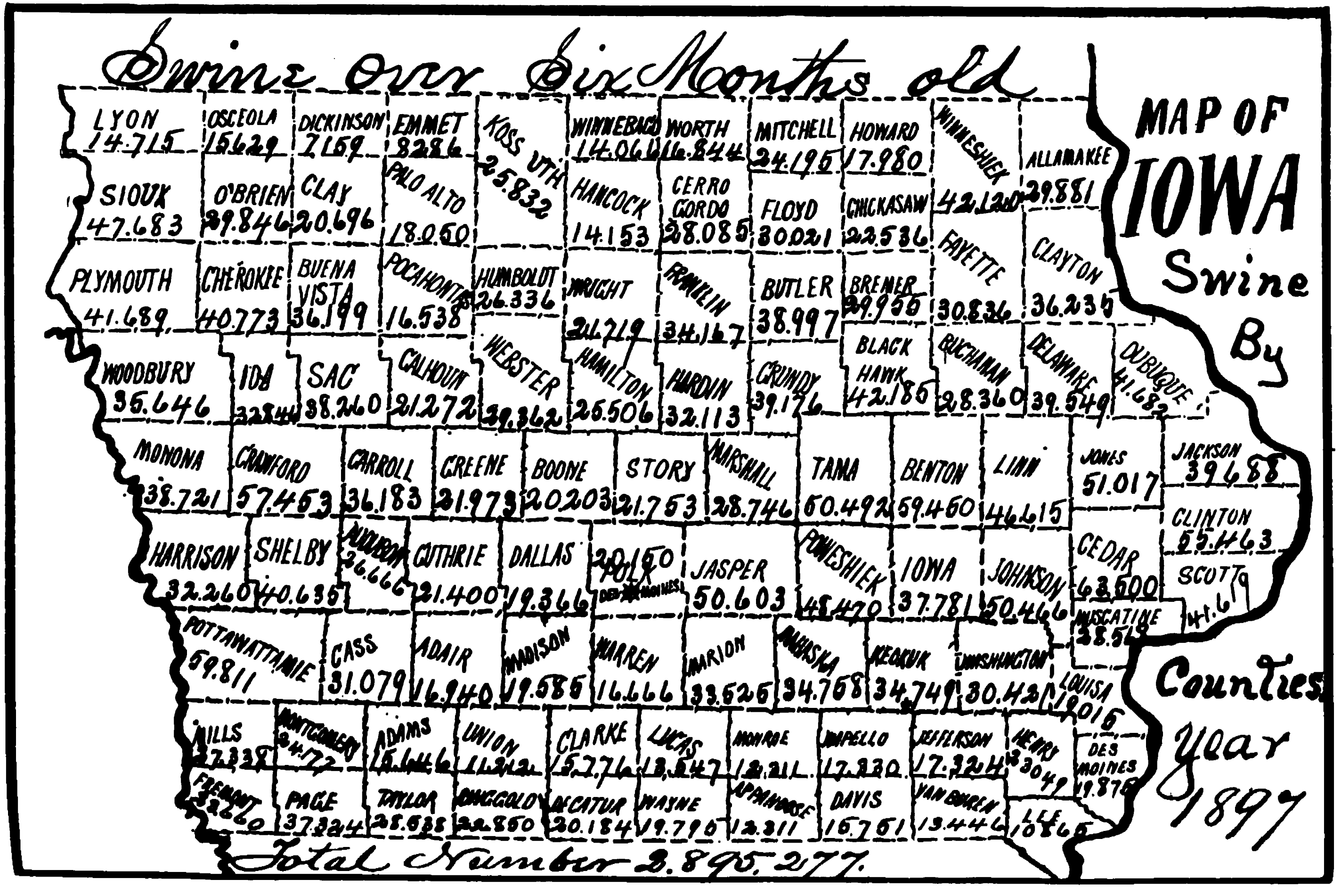
State Average $1\frac{3}{10}$ Tons Per Acre

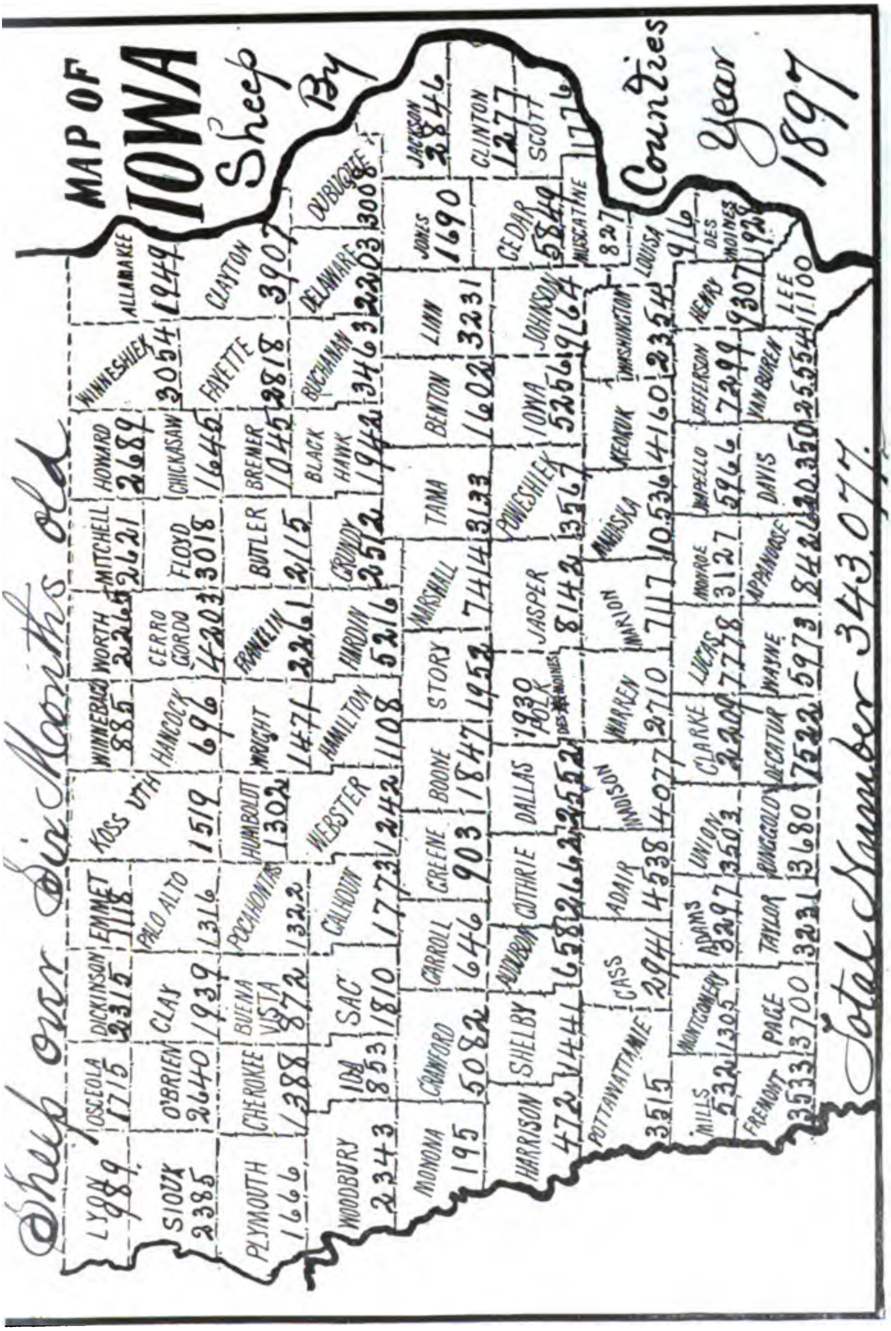
Farm Value $ 7,174,732. Dec. 1" 1897

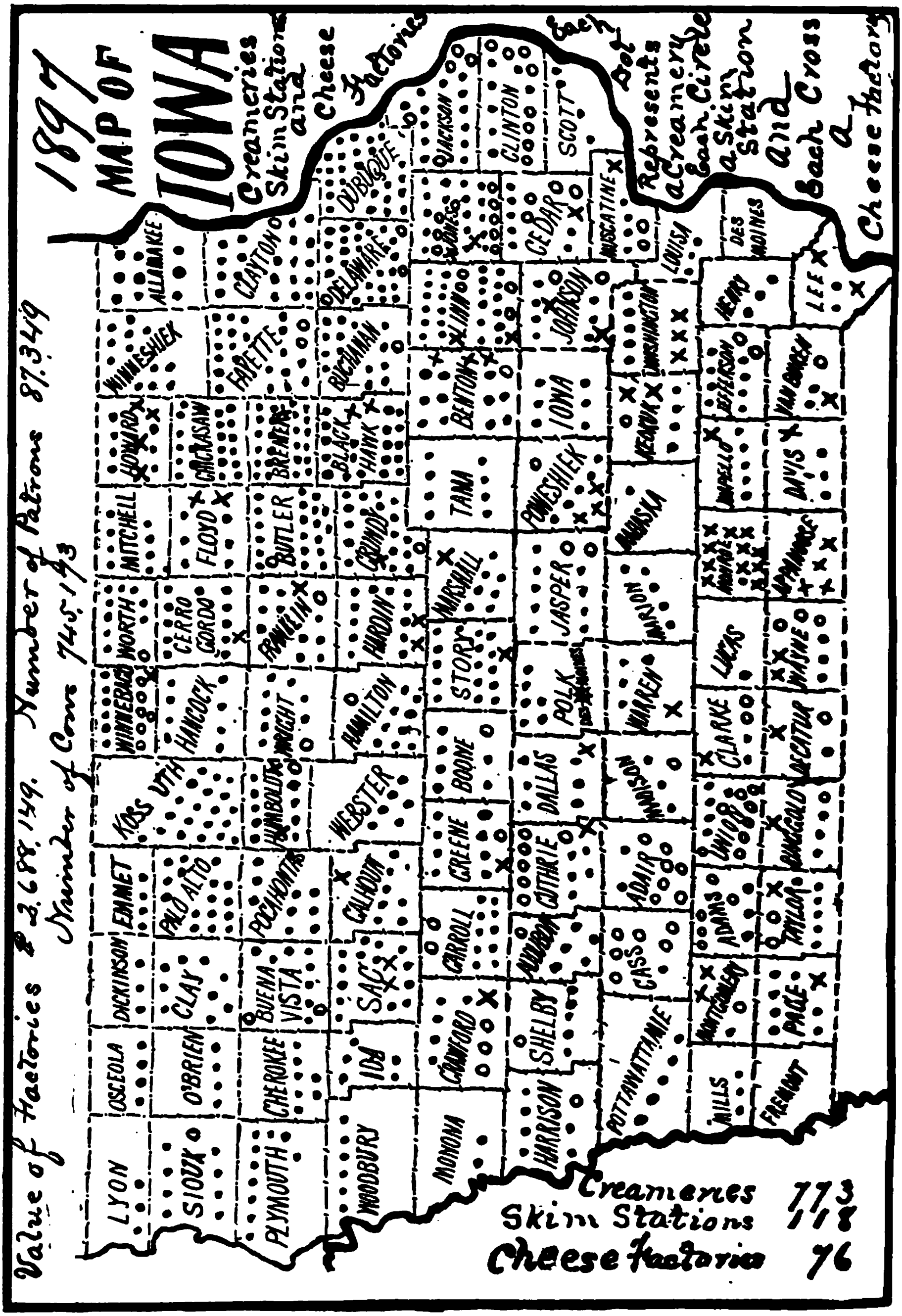

Horses over One Year old
MAP OF IOWA
Horses By Counties
Year 1897
LYON 9627
OSCEOLA 6626
DICKINSON 5365
EMMET 6052
KOSSUTH 15129
WINNEBAGO 7005
WORTH 7434
MITCHELL 8888
HOWARD 8913
WINNESHIEK 12.512
ALLAMAKEE 9640
SIOUX 14.561
O'BRIEN 9528
CLAY 9136
PALO ALTO 8827
HANCOCK 8801
CERRO GORDO 11.350
FLOYD 10.614
CHICKASAW 9348
FAYETTE 14.351
CLAYTON 13.218
PLYMOUTH 14.328
CHEROKEE 9212
BUENA VISTA 10.553
POCAHONTAS 9579
HUMBOLDT 7947
WRIGHT 10.727
FRANKLIN 10.185
BUTLER 12.531
BREMER 8.388
BLACK HAWK 12.431
BUCHANAN 11.557
DELAWARE 9849
DUBUQUE 11.984
WOODBURY 15.764
IDA 7620
SAC 10.729
CALHOUN 10.769
WEBSTER 14.156
HAMILTON 11.449
HARDIN 10.409
GRUNDY 10.939
MONONA 12.654
CRAWFORD 13.069
CARROLL 11.056
GREENE 10.919
BOONE 11.908
STORY 13.210
MARSHALL 12.456
TAMA 18.776
BENTON 16.404
LINN 18.349
JONES 13.427
JACKSON 11.465
CLINTON 13.456
HARRISON 12.810
SHELBY 11.409
AUDUBON 4979
GUTHRIE 11.862
DALLAS 13.709
POLK 17475
DES MOINES
JASPER 18.510
POWESHIEK 13.112
IOWA 10.390
JOHNSON 14.189
CEDAR 13.763
SCOTT 11.763
MUSCATINE 10.046
POTTAWATTAMIE 19.579
CASS 12.145
ADAIR 11.396
MADISON 12.437
WARREN 12.966
MARION 13.813
MAHASKA 15.591
KEOKUK 16.711
WASHINGTON 13.964
LOUISA 9305
MILLS 10.291
MONTGOMERY 9234
ADAMS 8770
UNION 9446
CLARKE 8857
LUCAS 8526
MONROE 6963
WAPELLO 10.569
JEFFERSON 9825
HENRY 11242
DES MOINES 9160
FREMONT 11.758
PAGE 13.957
TAYLOR 12.740
RINGGOLD 12.265
DECATUR 12.349
WAYNE 13223
APPANOOSE 11.897
DAVIS 11.471
VAN BUREN 10.719
LEE 10.456
Total Number 1,137,009.


MAP OF IOWA
Cattle By Counties
Year 1897
Cattle over One Year old
Total Number 2,334,462
LYON 10.704
OSCEOLA 9.123
DICKINSON 7.225
EMMET 8.728
KOSSUTH 28.575
WINNEBAGO 13.251
WORTH 17.778
MITCHELL 19.777
HOWARD 17.480
WINNESHIEK 27.714
ALLAMAKEE 19.580
SIOUX 24.157
O'BRIEN 20.024
CLAY 18.942
PALO ALTO 20.733
HANCOCK 15.512
CERRO GORDO 24.742
FLOYD 20.494
CHICKASAW 24.398
FAYETTE 34.887
CLAYTON 30.010
PLYMOUTH 26.467
CHEROKEE 35.604
BUENA VISTA 25.169
POCAHONTAS 22.087
HUMBOLDT 18.615
WRIGHT 21.189
FRANKLIN 24.527
BUTLER 26.345
BREMER 25.786
BUCHANAN 29.539
DELAWARE 31.671
DUBUQUE 27.302
WOODBURY 27.608
IDA 30.827
SAC 29.744
CALHOUN 21.242
WEBSTER 23.697
HAMILTON 24.473
HARDIN 34.919
GRUNDY 29.055
BLACK HAWK 32.105
MONONA 30.681
CRAWFORD 32.677
CARROLL 24.303
GREENE 22.235
BOONE 22.857
STORY 22.527
MARSHALL 27.810
TAMA 34.521
BENTON 32.765
LINN 35.378
JONES 37.594
JACKSON 26.372
CLINTON 38.350
SCOTT 21.881
CEDAR 30.892
MUSCATINE 15.762
JOHNSON 30.419
IOWA 27.933
POWESHIEK 31.181
JASPER 32.754
POLK 23.333
DES MOINES
DALLAS 26.153
GUTHRIE 22.086
AUDUBON 17.748
SHELBY 22.841
HARRISON 35.280
POTTAWATTAMIE 45.660
CASS 23.579
ADAIR 23.367
MADISON 22.490
WARREN 24.290
MARION 23.015
MAHASKA 30.689
KEOKUK 23.746
WASHINGTON 24.382
LOUISA 13.944
DES MOINES 16.480
HENRY 18.858
LEE 16.720
JEFFERSON 18.269
VAN BUREN 17.442
WAPELLO 16.186
DAVIS 18.612
MONROE 15.575
APPANOOSE 21.660
LUCAS 14.736
WAYNE 26.996
CLARKE 16.993
DECATUR 30.689
UNION 18.505
RINGGOLD 28.812
ADAMS 21.171
TAYLOR 22.661
MONTGOMERY 20.042
PAGE 35.191
MILLS 18.544
FREMONT 19.435


MAP OF IOWA
Mules By Counties
Year 1897
Mules over One Year old
Total Number 38843
LYON 221
OSCEOLA 163
DICKINSON 123
EMMET 138
KOSSUTH 217
WINNEBAGO 99
WORTH 51
MITCHELL 57
HOWARD 30
WINNESHIEK 68
ALLAMAKEE 33
SIOUX 494
O'BRIEN 150
CLAY 120
PALO ALTO 148
HANCOCK 189
CERRO GORDO 79
FLOYD 83
CHICKASAW 47
FAYETTE 155
CLAYTON 142
PLYMOUTH 446
CHEROKEE 137
BUENA VISTA 250
POCAHONTAS 309
HUMBOLDT 168
WRIGHT 242
FRANKLIN 125
BUTLER 114
BREMER 38
BLACK HAWK 200
BUCHANAN 137
DELAWARE 115
DUBUQUE 141
WOODBURY 701
IDA 415
SAC 386
CALHOUN 430
WEBSTER 361
HAMILTON 293
HARDIN 143
GRUNDY 271
MONONA 1000
CRAWFORD 647
CARROLL 390
GREENE 300
BOONE 375
STORY 480
MARSHALL 233
TAMA 293
BENTON 235
LINN 356
JONES 287
JACKSON 204
CLINTON 161
SCOTT 350
HARRISON 997
SHELBY 641
AUDUBON 511
GUTHRIE 444
DALLAS 436
POLK 667
DES MOINES
JASPER 686
POWESHIEK 527
IOWA 460
JOHNSON 541
CEDAR 579
MUSCATINE 350
POTTAWATTAMIE 1803
CASS 876
ADAIR 546
MADISON 598
WARREN 486
MARION 434
MAHASKA 871
KEOKUK 625
WASHINGTON 463
LOUISA 204
MILLS 1022
MONTGOMERY 543
ADAMS 608
UNION 284
CLARKE 369
LUCAS 389
MONROE 315
WAPELLO 427
JEFFERSON 164
HENRY 249
DES MOINES 228
FREMONT 1981
PAGE 1052
TAYLOR 572
RINGGOLD 621
DECATUR 612
WAYNE 589
APPANOOSE 549
DAVIS 427
VAN BUREN 193
LEE 461


MAP OF IOWA
Swine By Counties
Year 1897
Swine over Six Months old
LYON 14.715
OSCEOLA 15.629
DICKINSON 7.159
EMMET 8.286
KOSS UTH 25.832
WINNEBAGO 14.066
WORTH 16.844
MITCHELL 24.195
HOWARD 17.980
WINNESHIEK 42.120
ALLAMAKEE 29.881
SIOUX 47.683
O'BRIEN 39.846
CLAY 20.696
PALO ALTO 18.050
HANCOCK 14.153
CERRO GORDO 28.085
FLOYD 30.021
CHICKASAW 22.536
FAYETTE 30.836
CLAYTON 36.235
PLYMOUTH 41.689
CHEROKEE 40.773
BUENA VISTA 36.199
POCAHONTAS 16.538
HUMBOLDT 26.336
WRIGHT 21.719
FRANKLIN 34.167
BUTLER 38.997
BREMER 29.956
BLACK HAWK 42.185
BUCHANAN 28.360
DELAWARE 39.549
DUBUQUE 41.682
WOODBURY 35.646
IDA 32.844
SAC 38.260
CALHOUN 21.272
WEBSTER 39.362
HAMILTON 26.506
HARDIN 32.113
GRUNDY 39.176
MONONA 38.721
CRAWFORD 57.453
CARROLL 36.183
GREENE 21.973
BOONE 20.203
STORY 21.753
MARSHALL 28.746
TAMA 60.492
BENTON 59.460
LINN 46.615
JONES 51.017
JACKSON 39.688
CLINTON 55.463
HARRISON 32.260
SHELBY 40.635
AUDUBON 26.666
GUTHRIE 21.400
DALLAS 19.366
POLK 20.160
DES MOINES
JASPER 50.603
POWESHIEK 45.470
IOWA 37.781
JOHNSON 50.466
CEDAR 63.500
SCOTT 41.619
MUSCATINE 38.51
POTTAWATTAMIE 59.811
CASS 31.079
ADAIR 16.940
MADISON 19.586
WARREN 16.666
MARION 33.626
MAHASKA 34.768
KEOKUK 34.749
WASHINGTON 30.420
LOUISA 19.016
MILLS 27.338
MONTGOMERY 24.772
ADAMS 15.646
UNION 11.912
CLARKE 15.776
LUCAS 13.847
MONROE 12.211
WAPELLO 17.330
JEFFERSON 17.324
HENRY 33.049
DES MOINES 19.878
FREMONT 32.260
PAGE 37.324
TAYLOR 25.638
RINGGOLD 22.860
DECATUR 20.184
WAYNE 19.790
APPANOOSE 12.311
DAVIS 16.761
VAN BUREN 13.446
LEE 10.866
Total Number 2.895.277.


MAP OF IOWA
Sheep By Counties
Year 1897
Sheep over Six Months old
Total Number 343077.
LYON 989
OSCEOLA 1715
DICKINSON 2315
EMMET 718
KOSSUTH 1519
WINNEBAGO 885
WORTH 2216
MITCHELL 2621
HOWARD 2689
WINNESHIEK 3054
ALLAMAKEE 1949
SIOUX 2385
O'BRIEN 2640
CLAY 1939
PALO ALTO 1316
HANCOCK 696
CERRO GORDO 4203
FLOYD 3018
CHICKASAW 1645
FAYETTE 2818
CLAYTON 3907
PLYMOUTH 1666
CHEROKEE 1388
BUENA VISTA 872
POCAHONTAS 1322
HUMBOLDT 1302
WRIGHT 1471
FRANKLIN 2261
BUTLER 2115
BREMER 1045
BUCHANAN 3463
DELAWARE 2203
DUBUQUE 3008
WOODBURY 2343
IDA 853
SAC 1810
CALHOUN 1773
WEBSTER 2142
HAMILTON 1108
HARDIN 5216
GRUNDY 2512
BLACK HAWK 1912
MONONA 195
CRAWFORD 5082
CARROLL 646
GREENE 903
BOONE 1847
STORY 1953
MARSHALL 7414
TAMA 3133
BENTON 1602
LINN 3231
JONES 1690
JACKSON 2846
CLINTON 1277
HARRISON 472
SHELBY 1441
AUDUBON 658
GUTHRIE 2162
DALLAS 2552
POLK 1930
DES MOINES
JASPER 8142
POWESHIEK 3567
IOWA 5256
JOHNSON 9164
CEDAR 5849
SCOTT 1176
MUSCATINE 827
POTTAWATTAMIE 3515
CASS 2941
ADAIR 4538
MADISON 4077
WARREN 2710
MARION 7117
MAHASKA 10536
KEOKUK 4160
WASHINGTON 2354
LOUISA 916
MILLS 532
MONTGOMERY 1305
ADAMS 3297
UNION 3503
CLARKE 2200
LUCAS 7778
MONROE 3127
WAPELLO 5966
JEFFERSON 7299
HENRY 9307
DES MOINES 1928
FREMONT 3533
PAGE 3700
TAYLOR 3231
RINGGOLD 3680
DECATUR 7522
WAYNE 5973
APPANOOSE 8482
DAVIS 20350
VAN BUREN 25554
LEE 1100



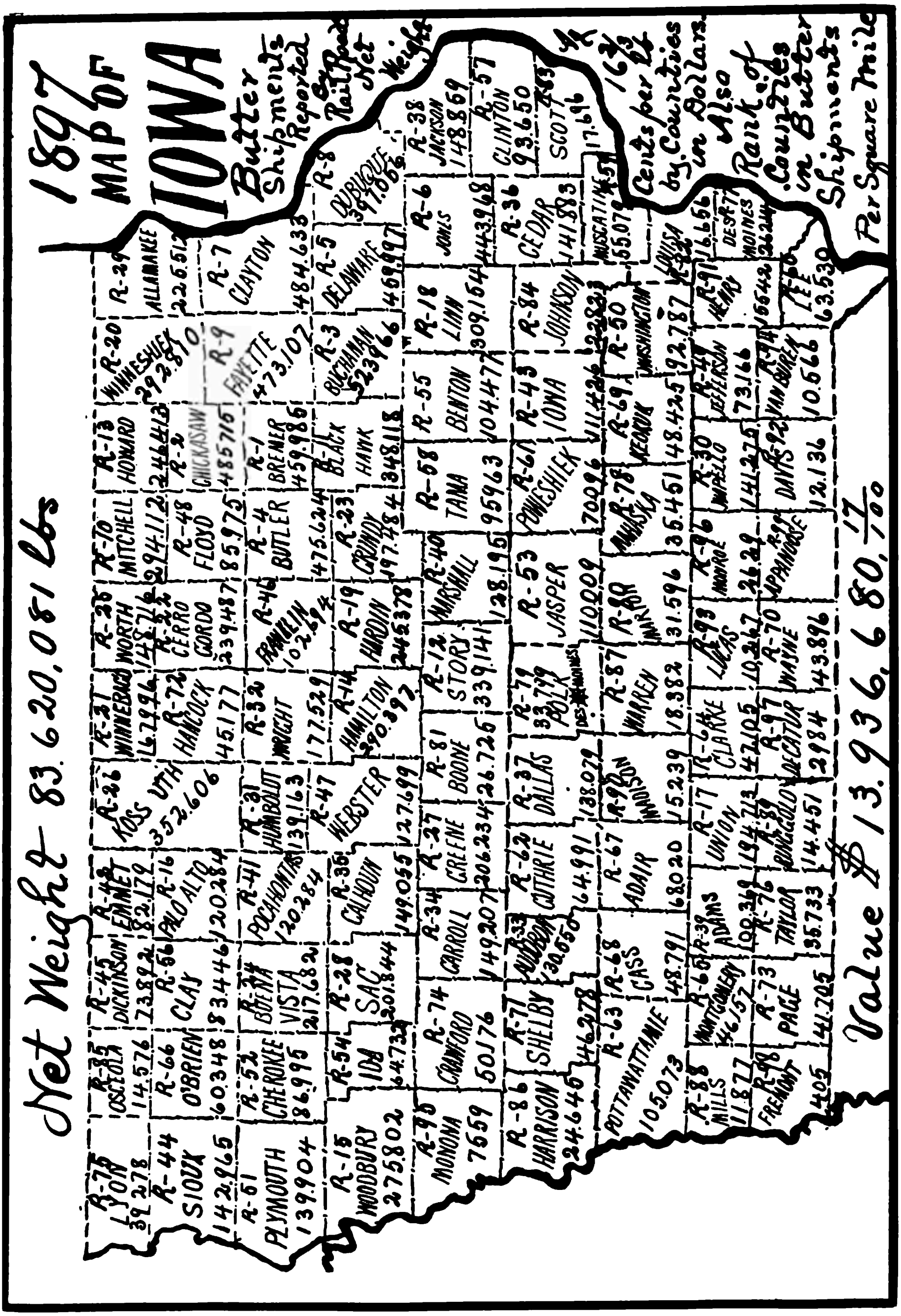
1897 MAP OF IOWA Creameries Skim Stations and Cheese Factories

Each Dot Represents a Creamery Each Circle a Skim Station and Each Cross a Cheese Factory

Value of Factories $2,698,149. Number of Patrons 87,349

Number of Cows 745,143

Creameries 773
Skim Stations 118
Cheese Factories 76


1897 MAP OF IOWA
Butter Shipments Reported By Rail Roads Net Weight
Net Weight 83.620,081 lbs
Value $13.936,680 17/100
16 2/3 Cents per lb
by Counties in Dollars.
Also Rank of Counties in Butter Shipments Per Square Mile
R-75 LYON 39.278
R-35 OSCEOLA 14.576
R-45 DICKINSON 73.892
R-48 EMMET 82.179
R-26 KOSSUTH 352.606
R-31 WINNEBAGO 162.996
R-28 WORTH 148.716
R-70 MITCHELL 294.112
R-13 HOWARD 246.413
R-20 WINNESHIEK 292.810
R-29 ALLAMAKEE 226.512
R-44 SIOUX 142.965
R-66 O'BRIEN 60.348
R-56 CLAY 83.446
R-16 PALO ALTO 120.284
R-72 HANCOCK 45.177
R-22 CERRO GORDO 239.487
R-48 FLOYD 85.975
R-2 CHICKASAW 485.715
R-9 FAYETTE 473.102
R-7 CLAYTON 484.633
R-61 PLYMOUTH 139.904
R-52 CHEROKEE 86.995
R-34 BUENA VISTA 217.682
R-41 POCAHONTAS 120.284
R-31 HUMBOLDT 139.163
R-32 WRIGHT 177.529
R-46 FRANKLIN 102.694
R-4 BUTLER 475.624
R-1 BREMER 459.986
R-3 BUCHANAN 523.966
R-5 DELAWARE 469.997
R-8 DUBUQUE 397.066
R-15 WOODBURY 275.802
R-54 IDA 64.732
R-28 SAC 201.844
R-36 CALHOUN 149.055
R-47 WEBSTER 127.699
R-14 HAMILTON 290.892
R-19 HARDIN 245.378
R-23 GRUNDY 197.484
R-11 BLACK HAWK 348.118
R-55 BENTON 104.477
R-18 LINN 309.164
R-6 JONES 443.968
R-38 JACKSON 148.869
R-57 CLINTON 93.650
R-83 SCOTT 17.696
R-95 MONONA 7.659
R-74 CRAWFORD 50.176
R-34 CARROLL 149.207
R-27 GREENE 206.234
R-81 BOONE 26.726
R-12 STORY 339.141
R-40 MARSHALL 128.195
R-58 TAMA 95.963
R-43 IOWA 111.426
R-84 JOHNSON 22.823
R-36 CEDAR 141.883
R-51 MUSCATINE 55.079
R-86 HARRISON 24.646
R-71 SHELBY 46.278
R-33 AUDUBON 30.650
R-62 GUTHRIE 64.991
R-37 DALLAS 138.022
R-79 POLK 33.799
DES MOINES
R-53 JASPER 110.009
R-64 POWESHIEK 70.096
R-50 WASHINGTON 92.787
LOUISA
R-91 DES MOINES 16.656
R-63 POTTAWATTAMIE 105.073
R-68 CASS 48.791
R-67 ADAIR 68.020
R-90 MADISON 15.239
R-87 WARREN 18.382
R-89 MARION 31.596
R-78 MAHASKA 35.451
R-69 KEOKUK 48.425
R-44 JEFFERSON 73.166
R-91 HENRY 56.542
R-60 LEE 63.530
R-88 MILLS 11.877
R-65 MONTGOMERY 46.152
R-39 ADAMS 100.369
R-17 UNION 194.713
R-64 CLARKE 47.105
R-93 LUCAS 10.267
R-96 MONROE 26.29
R-30 WAPELLO 141.275
R-94 VAN BUREN 10.666
R-98 FREMONT 405
R-73 PAGE 41.205
R-76 TAYLOR 35.733
R-85 RINGGOLD 14.451
R-97 DECATUR 2.984
R-70 WAYNE 43.896
R-88 APPANOOSE
R-92 DAVIS 12.136

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57	91	26	1.63	31	69	-7	.13	.6	17	43	-19	....	....	46.7	101	-22	.....	....
56	90	24	.46	35	73	-4	.75	....	19	46	-12	2.21	17.0	48.7	102	-18	30.27	39.0
60	90	31	2.58	38	71	-2	T	T	23	48	-19	1.70	17.0	49.8	103	-19	22.88	28.8
54	84	30	1.10	32	68	-6	.88	2.0	16	40	-10	1.27	12.8	44.4	92	-25	32.98	37.9
56	90	24	.40	32	74	-13	.52	1.0	15	41	-18	.95	10.0	....	102	-23	.....	....
58	92	32	1.61	35	72	-5	.33	.5	19	50	-12	1.40	14.2	49.0	100	-17	27.65	35.3
55	78	31	.42	36	70	-4	.58	.2	19	42	-14	1.14	11.4	....	....	-20	.....	21.1
56	89	25	1.86	32	73	-8	.40	.5	20	42	-15	1.91	19.0	46.2	98	-23	29.56	34.0
..	....	....	1.94	34	69	-5	.35	.2	18	43	-16	1.61	16.7	....	98	-17	.....	....
55	88	26	.70	30	74	-10	.71	2.8	14	42	-13	1.19	9.0	44.9	97	-23	27.34	40.3
59	89	37	.77	39	....	....	.35	T	19	43	-6	1.44	....	....	97	....	.....	....
59	89	32	.73	36	72	-3	.63	T	19	45	-10	1.82	....	49.4	99	-16	31.10	.. .
56	91	24	.73	39	73	-12	.40	4.0	16	42	-18	.84	18.0	46.6	100	-23	20.55	45.0
54	89	23	.40	30	70	-9	.36	.4	14	40	-17	1.93	17.2	43.9	96	-24	25.74	40.1
59	90	29	.64	40	76	-2	.72	T	....	....	-15	2.26	21.5	....	98	-18	30.69	43.1
58	91	26	.33	37	81	2	1.98	T	19	49	-10	2.48	17.0	48.9	100	-20	31.13	46.0
56	87	27	....	36	70	-2	....	....	17	49	-10	....	....	....	93	-18	.....	....
55	89	23	1.39	31	73	-12	.47	....	14	43	-18	2.00	20.0	45.6	100	-26	26.50	41.2
62	92	33	.24	41	75	5	1.17	T	25	59	-2	1.84	7.4	52.6	98	-16	33.14	22.9
60	91	30	.11	40	71	4	1.80	T	23	53	-8	1.28	10.0	52.0	99	-14	34.13	30.5
59	89	29	.51	37	72	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]